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A COMPILATION OF SPACECRAFT LOADS DATA
FROM
FOUR TITAN CENTAUR LAUNCH VEHICLE FLIGHTS

VOLUME III: SHOCK SPECTRA OF TRANSIENTS

Compiled by: George Kachadourian

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PART 4: SHOCK SPECTRA OF TRANSIENTS
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January 1977

VOLUME III

SHOCK SPECTRA OF TRANSIENT EVENTS

SECTION 4

TC-3 Launch --- Viking B Spacecraft

Launch Date - September 9, 1975

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Contents Description - Section 4, Viking B Shock Spectra

Spectra

This appendix presents shock spectrum analyses of the eight parameters listed below for booster transient events. The events, event times and digital sample rates for which analyses were performed are shown in the matrix of Table 1. Additional measurement descriptions and measurement location are presented in Table 2 and Figure 1.

Parameters For Which Shock Spectrum Analyses Were Performed

Parameter	Description
CY1820 CY1830 CY1840 CY1850	Vibration measurements of the Viking Orbiter Bus; CY1830 is transverse, all others are longitudinal.
\ddot{X}_L \ddot{Y}_L \ddot{Z}_L	Acceleration of the Viking Lander Capsule (VLC) c. g. obtained through transformation of Viking Lander Capsule Adapter (VLCA) Strain gages assuming a rigid VLC
\ddot{Z}_B	Average of phase correlated longitudinal vibration measurements.

TABLE 4.1 DATA ANALYSIS MATRIX: TC-3 SHOCK SPECTRA

Event, Analysis Start Time	IRIG No. → Sensor No. →	#18 CY1820	#17 CY1830	#16 CY1840	#15 CY1850	\ddot{X}_L	\ddot{Y}_L	\ddot{Z}_L	\ddot{Z}_B
Stg. 0 Ign. 67139.8	(T-0.2)	A&B	A&B	A&B	A&B	A	A	A	A
FBR Release 67239.9	(T + 99.9)	B	B	B	B				
Stg. 1 Ign. 67251.5	(T + 111.5)	A&B	A&B	A&B	A&B	A	A	A	A
Jett SRM 67262.9	(T + 122.9)	A&B	A&B	A&B	A&B	A	A	A	A
Stg. 1 BO/Stg. 2 Ign. 67400.6	(T + 260.6)	A&B	A&B	A&B	A&B	A	A	A	A
Jett Shroud 67411.6	(T + 271.6)	A&B	A&B	A&B	A&B	A	A	A	A
Stg. 2 BO 67608.2	(T + 468.2)	A&B	A&B	A&B	A&B	A	A	A	A
T/C Separation 67613.2	(T + 473.2)	B	B	B	B				
MES-1 67624.8	(T + 484.8)	A&B	A&B	A&B	A&B	A	A	A	A
MECO-1 67753.05	(T + 613.05)	B	B	B	B				
MES-2 68846.8	(T + 706.8)	B	B	B	B				
MECO-2 69146.5	(T + 1006.5)	B	B	B	B				

Note: A&B refer to digitization rates of 1024 & 4096: See Table 2.

TABLE 4.2 FM/FM TELEMETRY INSTRUMENTATION, 2208.5 MHz LINK, TC-3

MEAS. NO.	DESCRIPTION	JPL DESIGNATION	RANGE		U N I T S	A C C U R A C Y	FM/FM CHANNEL	FILTER CUT OFF FREQUENCY - Hz	
			LOW	HIGH				A 1024 SPS	B 4096 SPS
CA386Y	Fwd.Equip.Comp.Amb.	-	120	150	db	5%	19	—	2800
CY182Ø	Longit.Vib; Foot H	2001AC1	-30	30	G	5%	18	133	2100
CY183Ø	Radial Vib.; Bay 7/8	2001AC2	-12	+12	G	5%	17	134	1580
CY184Ø	Longit. Vib., Foot C	2001AC3	- 5	+ 5	G	5%	16	135	1200
CY185Ø	Longit. Vib., Foot R	2001AC4	- 5	+ 5	G	5%	15	137	900
CY186S	VLCA #750 Strain 1	2001SG1	10000C	8000T	Lbs	5%	14	140	—
CY187S	VLCA #751 Strain 2	2001SG2	10000C	8000T	Lbs	5%	13	145	—
CY188S	VLCA #752 Strain 3	2001SG3	10000C	8000T	Lbs	5%	12	153	—
CY189S	VLCA #753 Strain 4	2001SG4	10000C	8000T	Lbs	5%	11	160	—
CY190S	VLCA #754 Strain 5	2001SG5	10000C	8000T	Lbs.	5%	10	180	—
CY191S	VLCA #755 Strain 6	2001SG6	10000C	8000T	Lbs.	5%	9	200	—
CY192P	VLC Bioshield DP		-0.25	0.75	PSID	5%	4	—	—
CY193P	VLC Bioshield Press.		0	16	PSIA	5%	3	—	—

① Range shown is max limit. Each gage will have a different range dependent on its calibration value.

A. This is a special set of filters which, in conjunction with discriminator characteristics, results in phase errors of less than 1° between VCO 9 through 18 below 40 Hz

B. These are twice the standard IRIG filter.

TABLE 4.3 - TIME OF FLIGHT EVENTS: VIKING B - TC-3 LAUNCH VEHICLE (9/9/75 Launch)

FLIGHT EVENT	Predicted Sec from LO	Actual Hrs Min Sec	Actual Seconds	From LO Seconds	From Stg I Ign. Seconds	
1 STG O IGN. /LO	0	18:39:00	67140	0		
2 MACH 1/MAX Q	50	18:39:42 ± 5	67182 ± 5	42 ± 5		
3 FBR RELEASE	100	18:40:40	67240	100		
4 STG O BO		18:40:44.5	67244.5	104.5		
5 STG I IGN	110	18:40:51.6	67251.6	111.6	0	
6 JETT SRM	122	18:41:02.95	67262.95	122.95	11.35	
7 STG I BO	259	18:43:20.85	67400.85	260.85	149.25	
8 STG II IGN	259.7	18:43:21.6	67401.6	261.6		
9 JETT SHROUD	270	18:43:31.6	67411.6	271.6		
10 STG II BO	468	18:46:48.3	67608.3	468.3		
11 JETT STG II	474	18:46:53.25	67613.25	473.25		
12 MES-1	485	18:47:04.8	67624.8	484.8		
13 MECO-1	613	18:49:13.1	67753.1	613.1		
14 MES-2	1699	19:07:26.8	68846.8	1706.8		
15 MECO-2	2005	19:12:27.7	69147.7	2002.7		
16 S/C SEP.	2225	19:16:07.7	69367.7	2227.7		

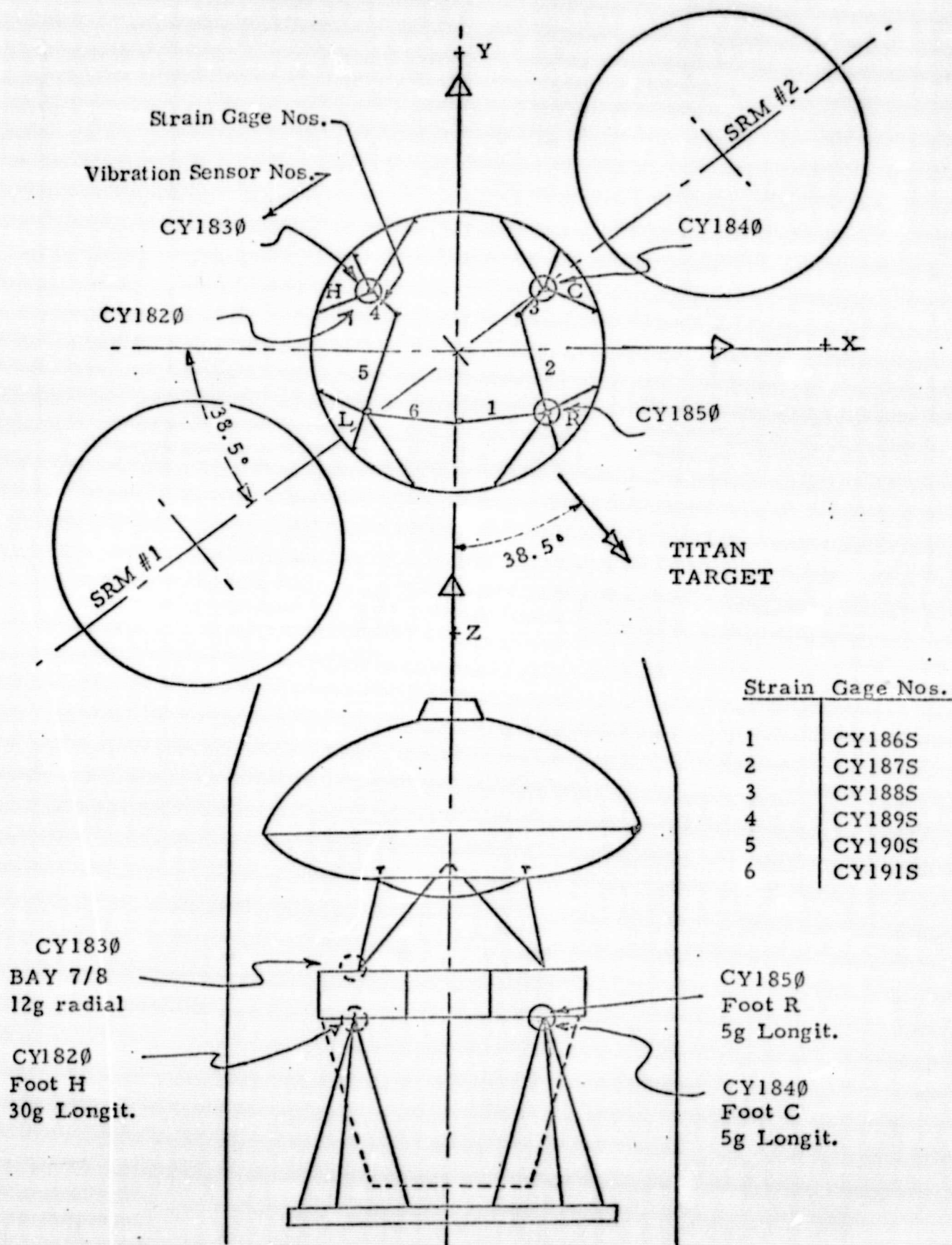
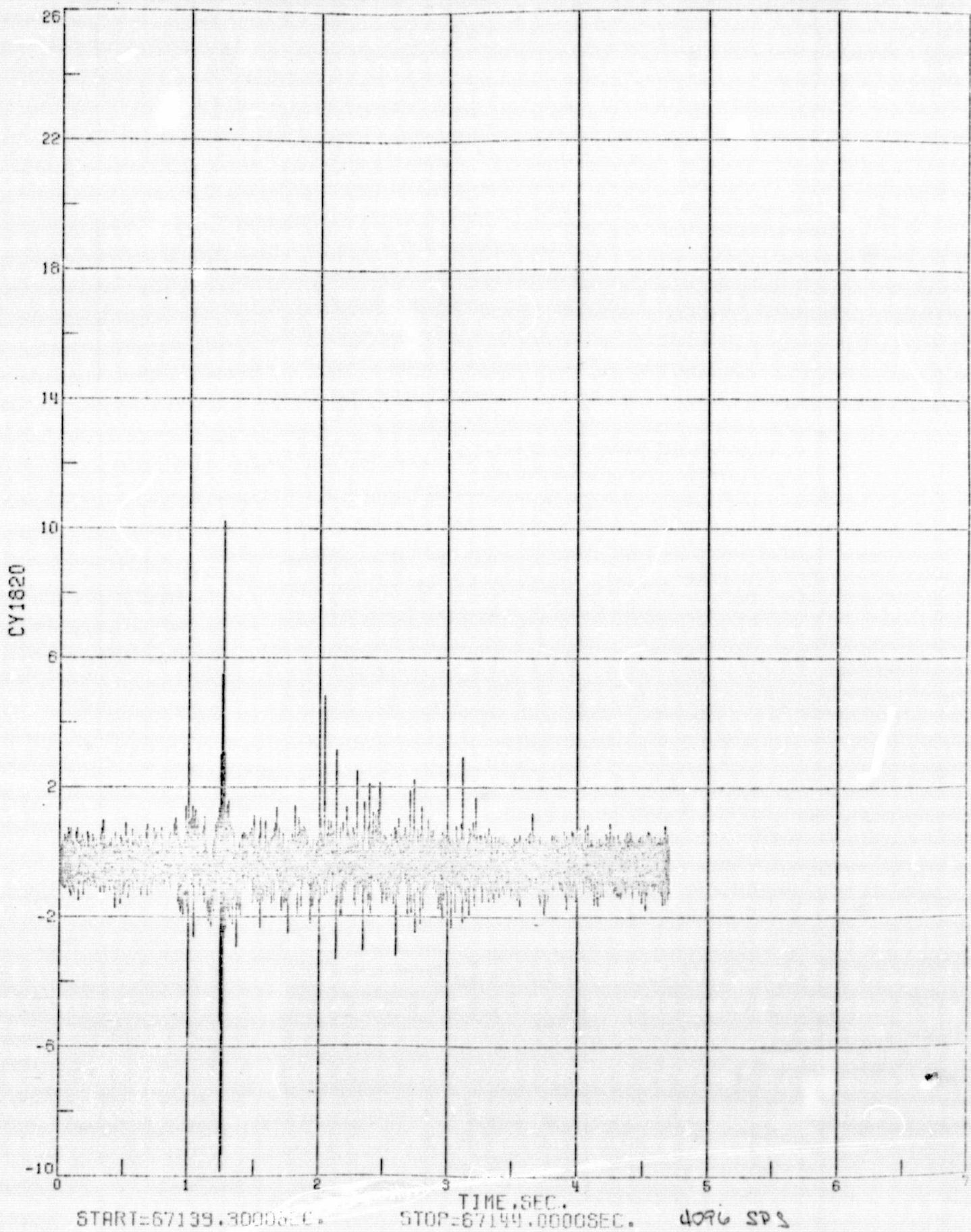


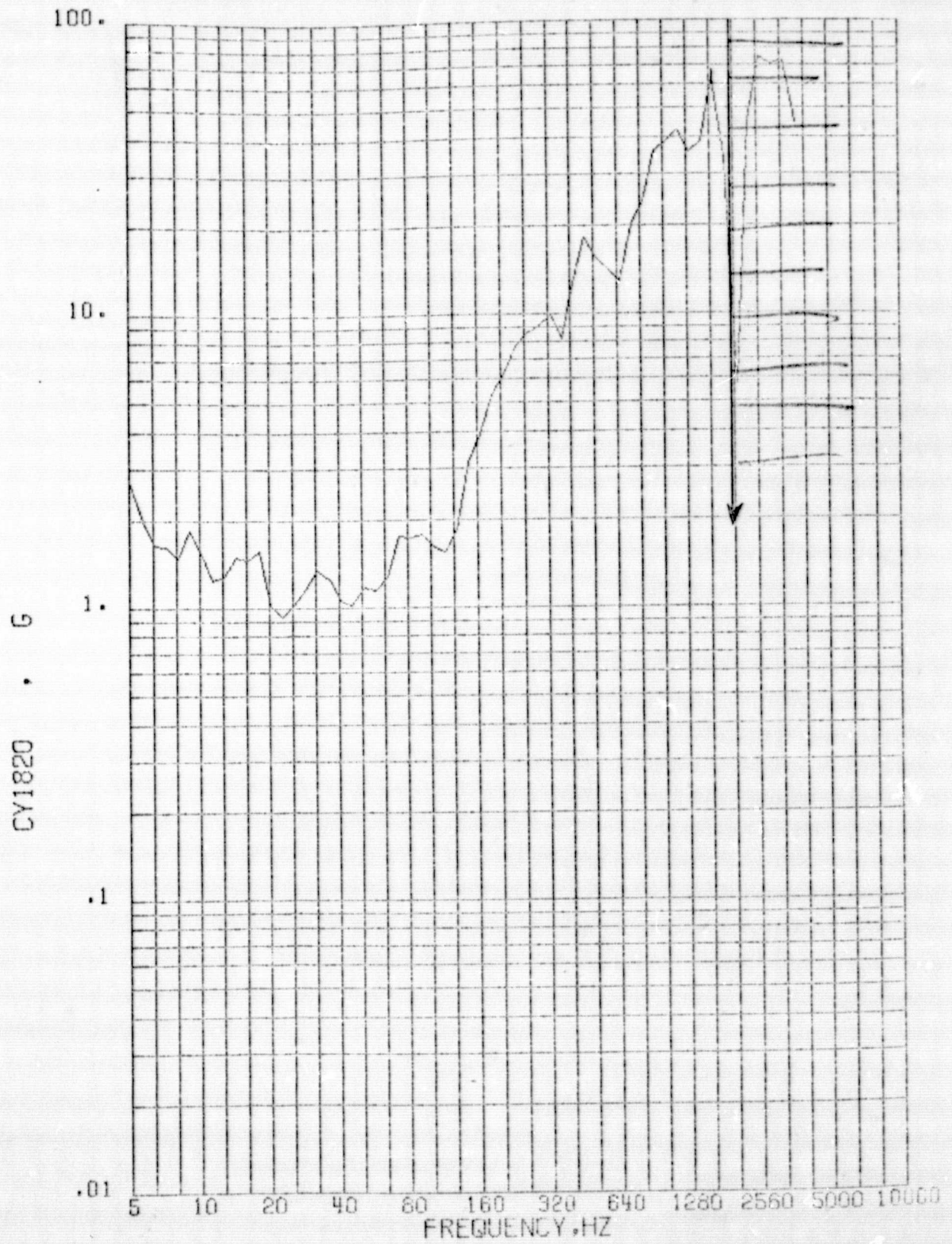
FIGURE 4.1. VIKING SPACECRAFT INSTRUMENT LOCATIONS

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4.2 4.6

SHOCK SPECTRUM



START=67135.8000SEC.

STOP=67143.9503SEC.

Q=10.

VIKING B

LIFT-OFF

4096 SPS

CY1820

4.2/4.7

Figure 4.2b

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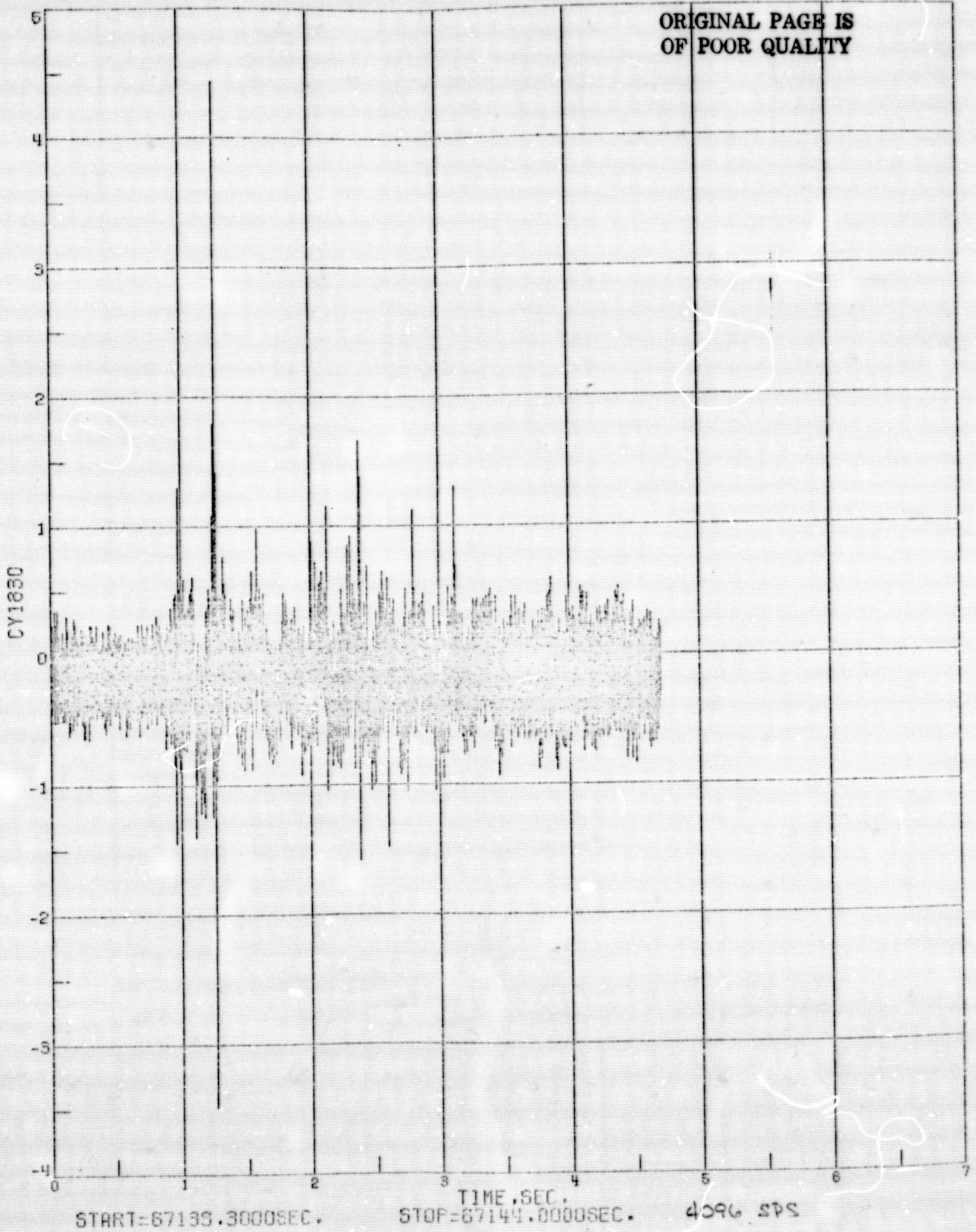
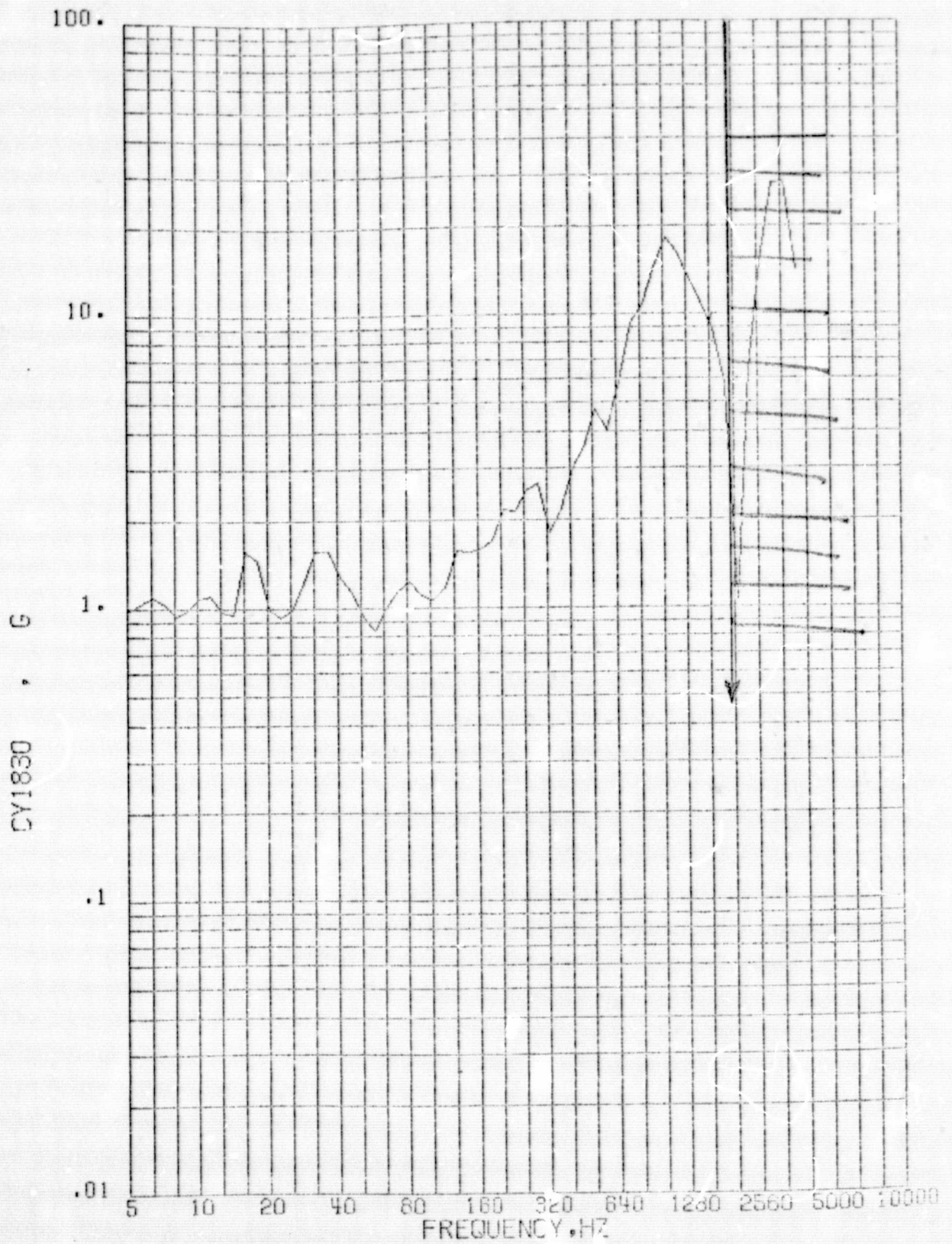


Figure 4.3a

SHOCK SPECTRUM



START=67139.8000SEC.

STOP=67143.9503SEC.

θ=10.

VIKING B

LIFT-OFF

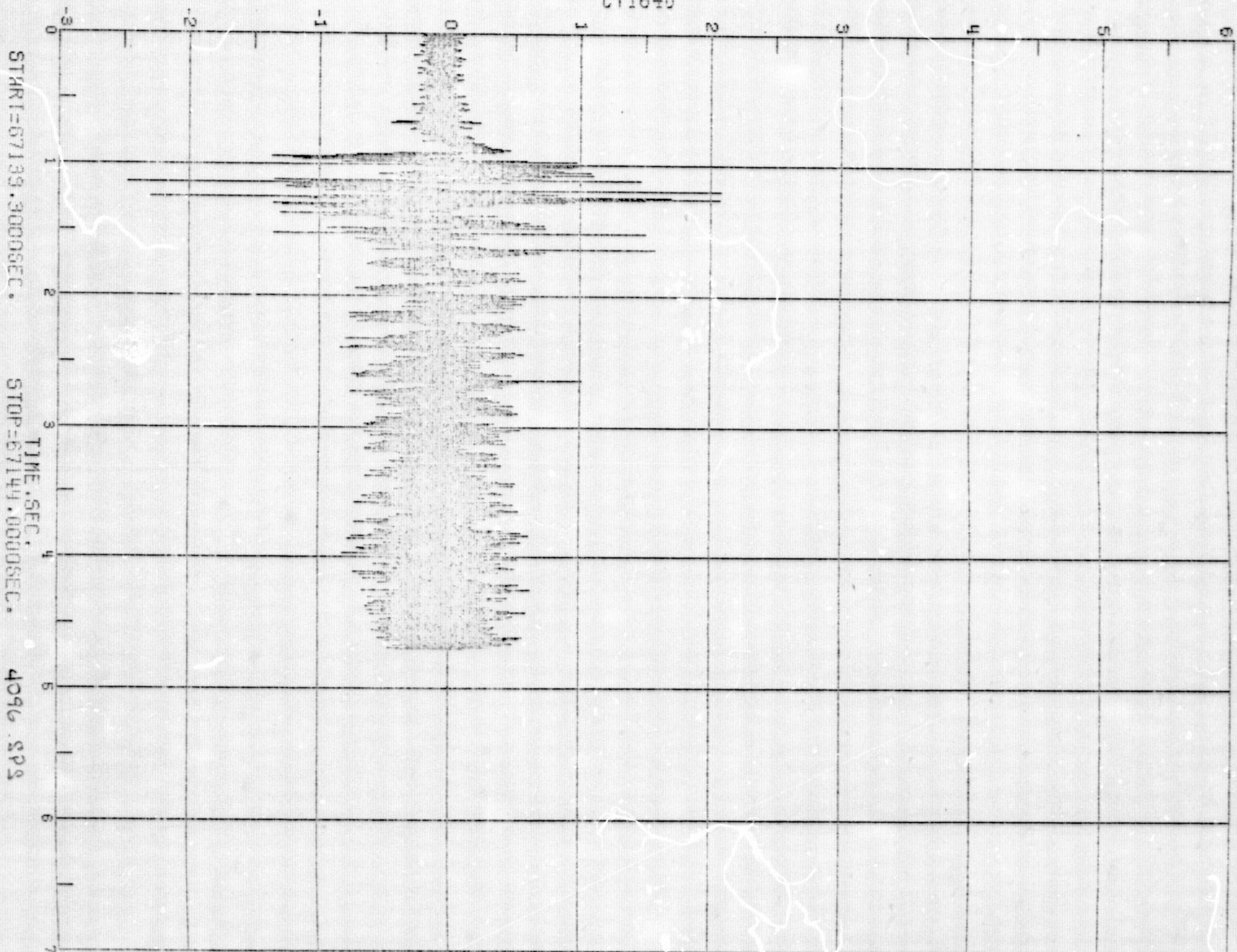
4096 SPS

CY1830

49
d3b

Figure 4.3b

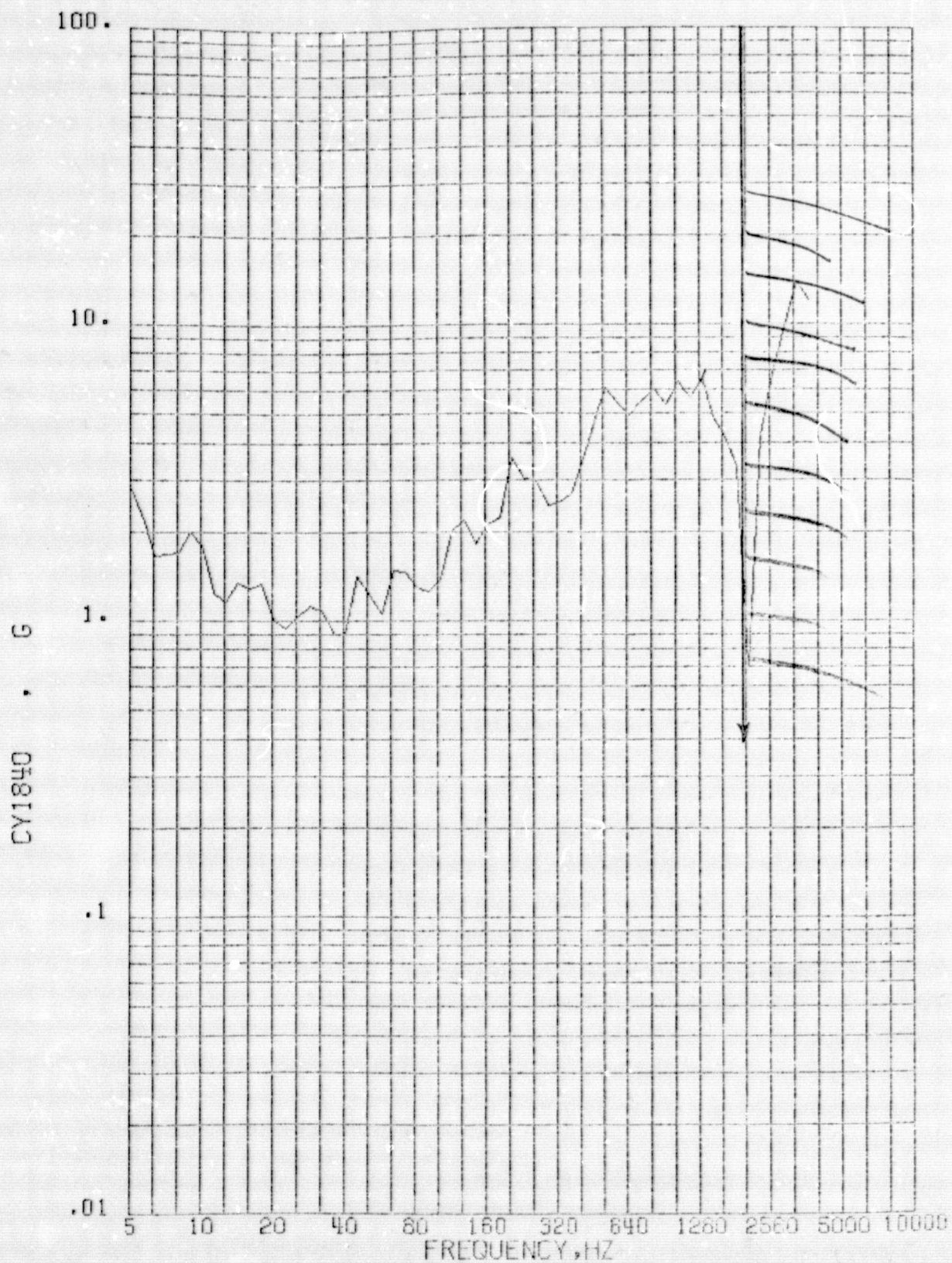
CY1840



4.44 4.10

Figure 4.4a

SHOCK SPECTRUM



START=67139.8000SEC.

STOP=67143.9503SEC.

Q=10.

VIKING B

LI FT-OFF

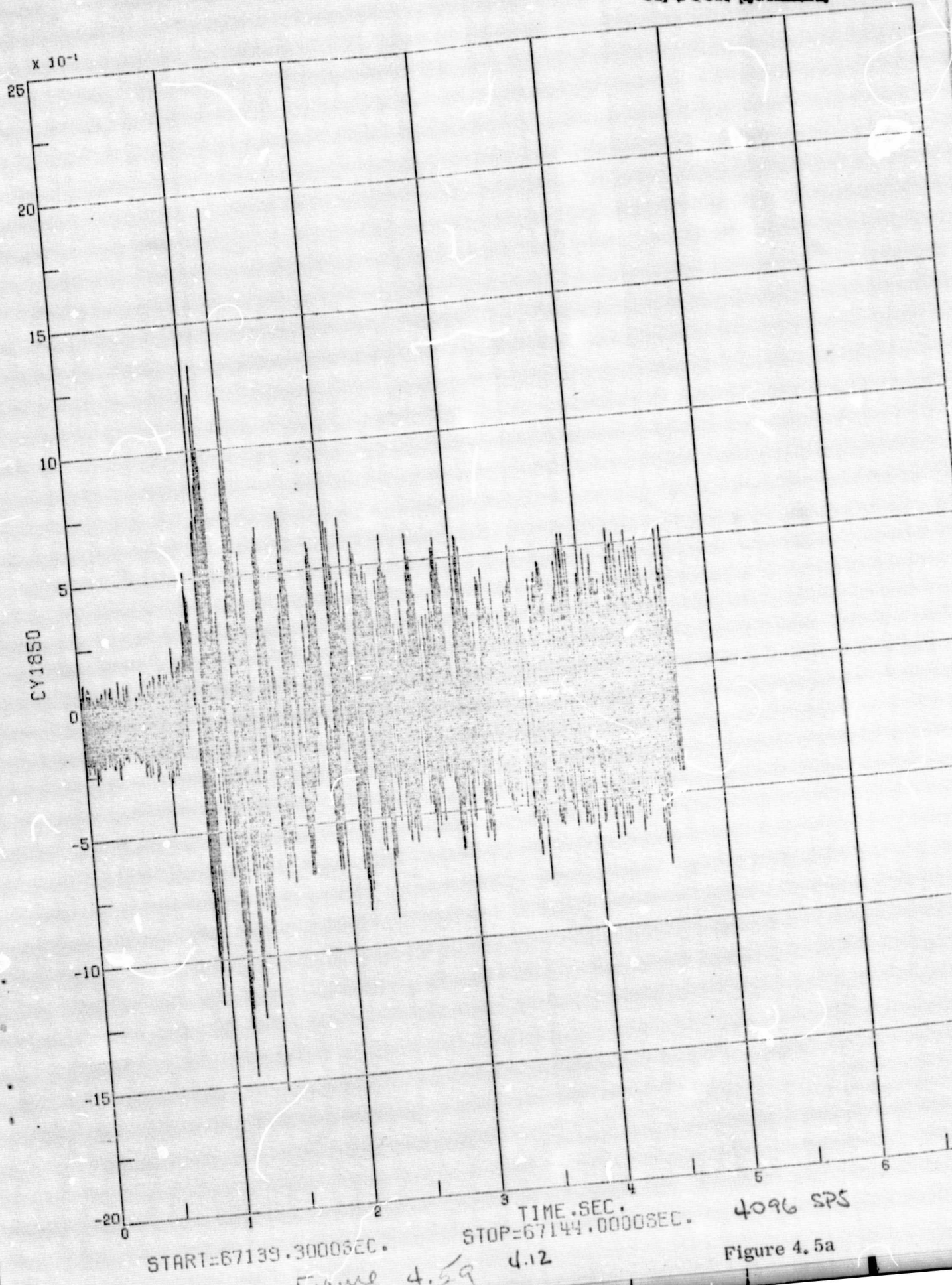
4096 SP3

CY1840

d. 4.11

Figure 4.4b

ORIGINAL PAGE IS
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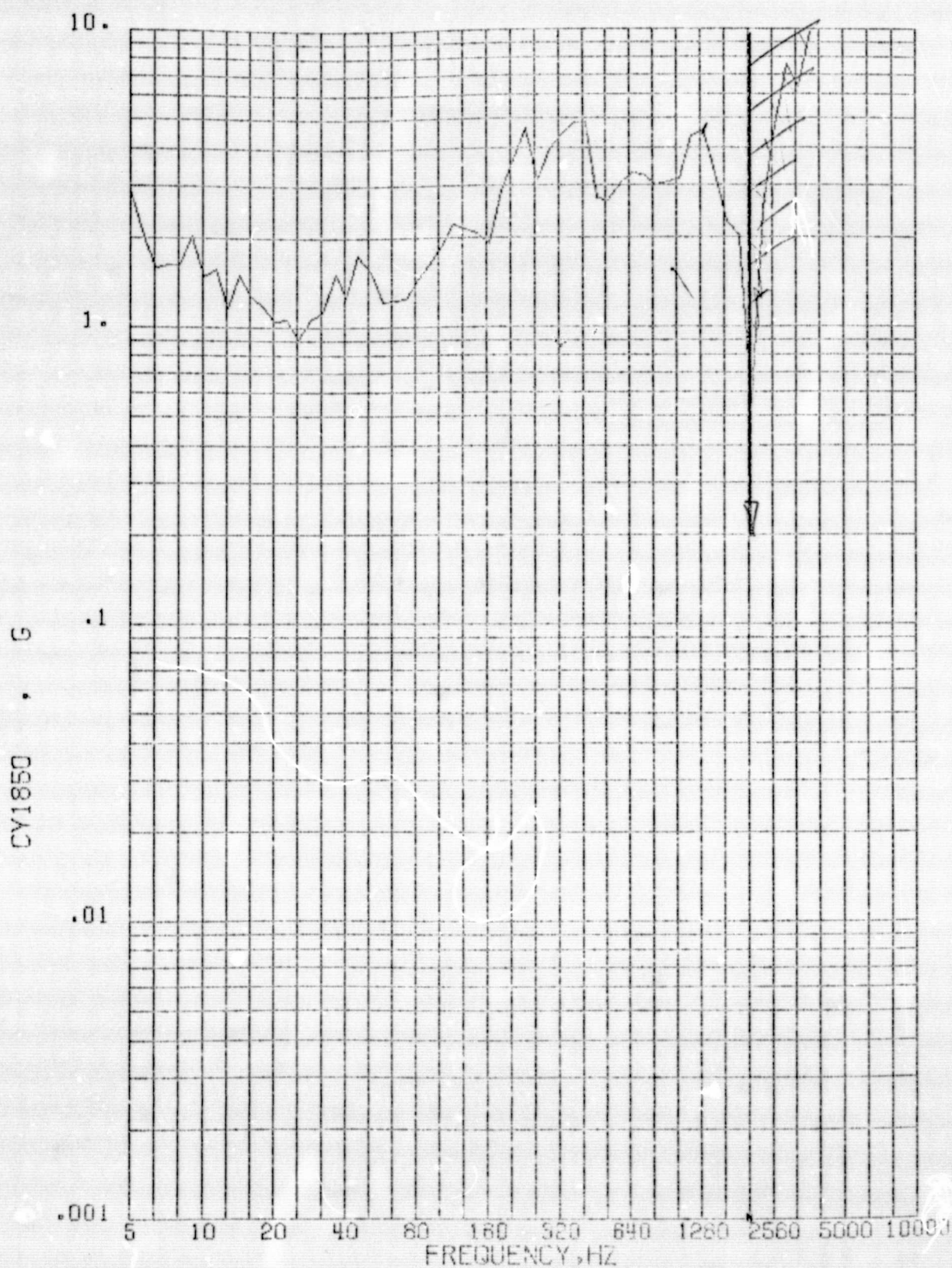
STOP=67144.0000SEC.

4096 SPS

Figure 4.5a

Figure 4.5a 4.12

SHOCK SPECTRUM



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STOP=67143.9503SEC.

Q=10.

VIKING B

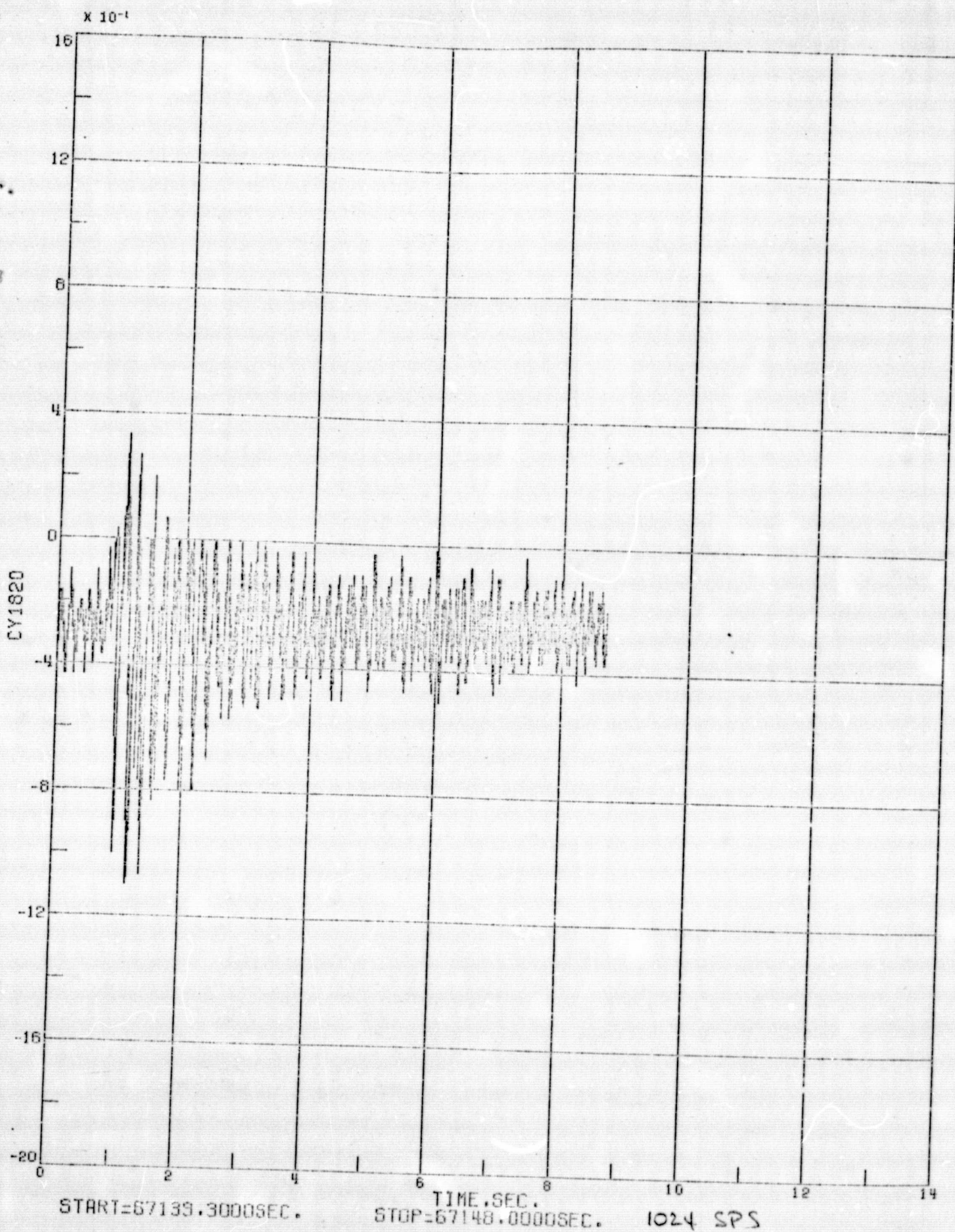
LI FT-OFF

4096 SPS

CY1850

4.56 4.13

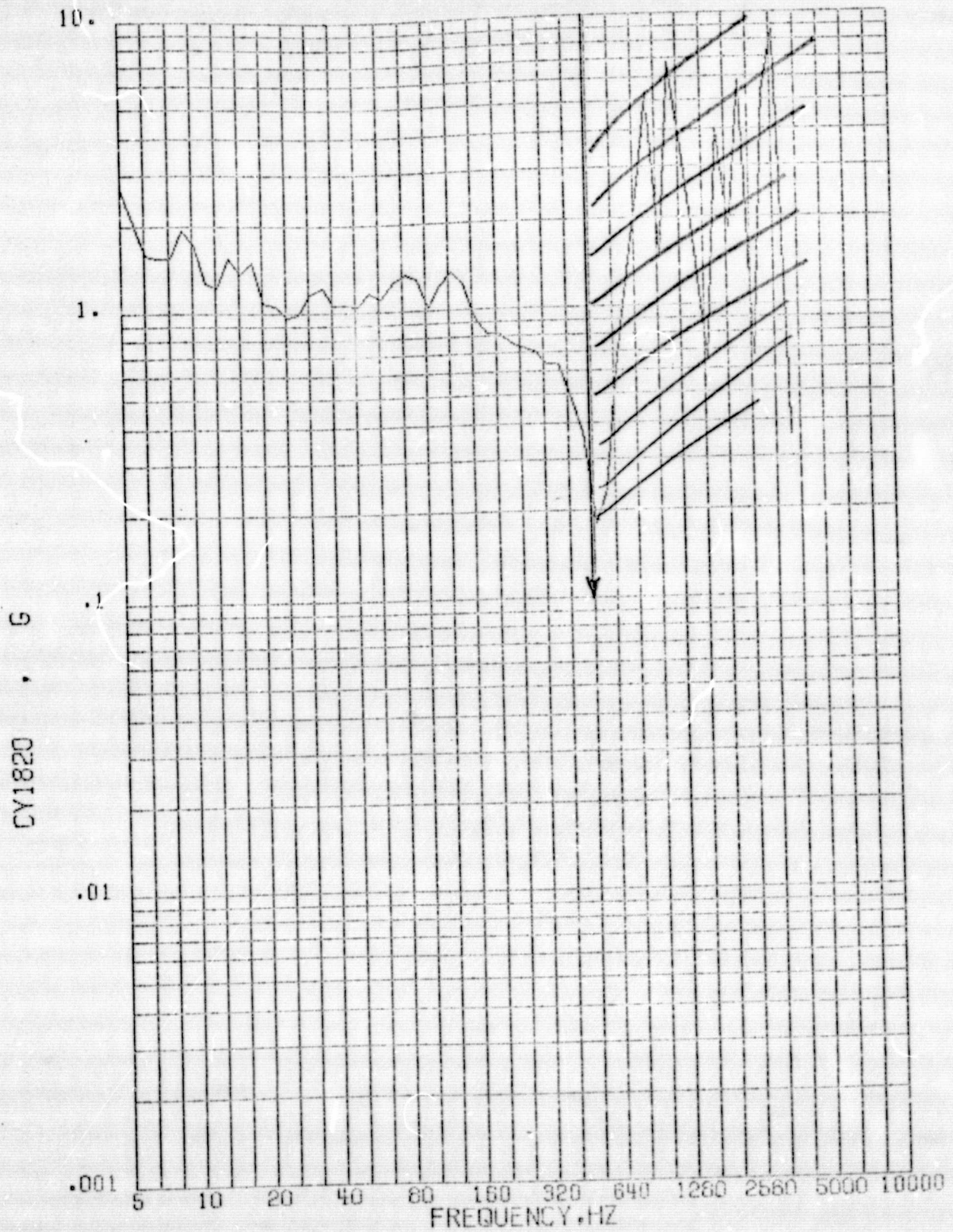
Figure 4. 5b



4.4.14

Figure 4.6a

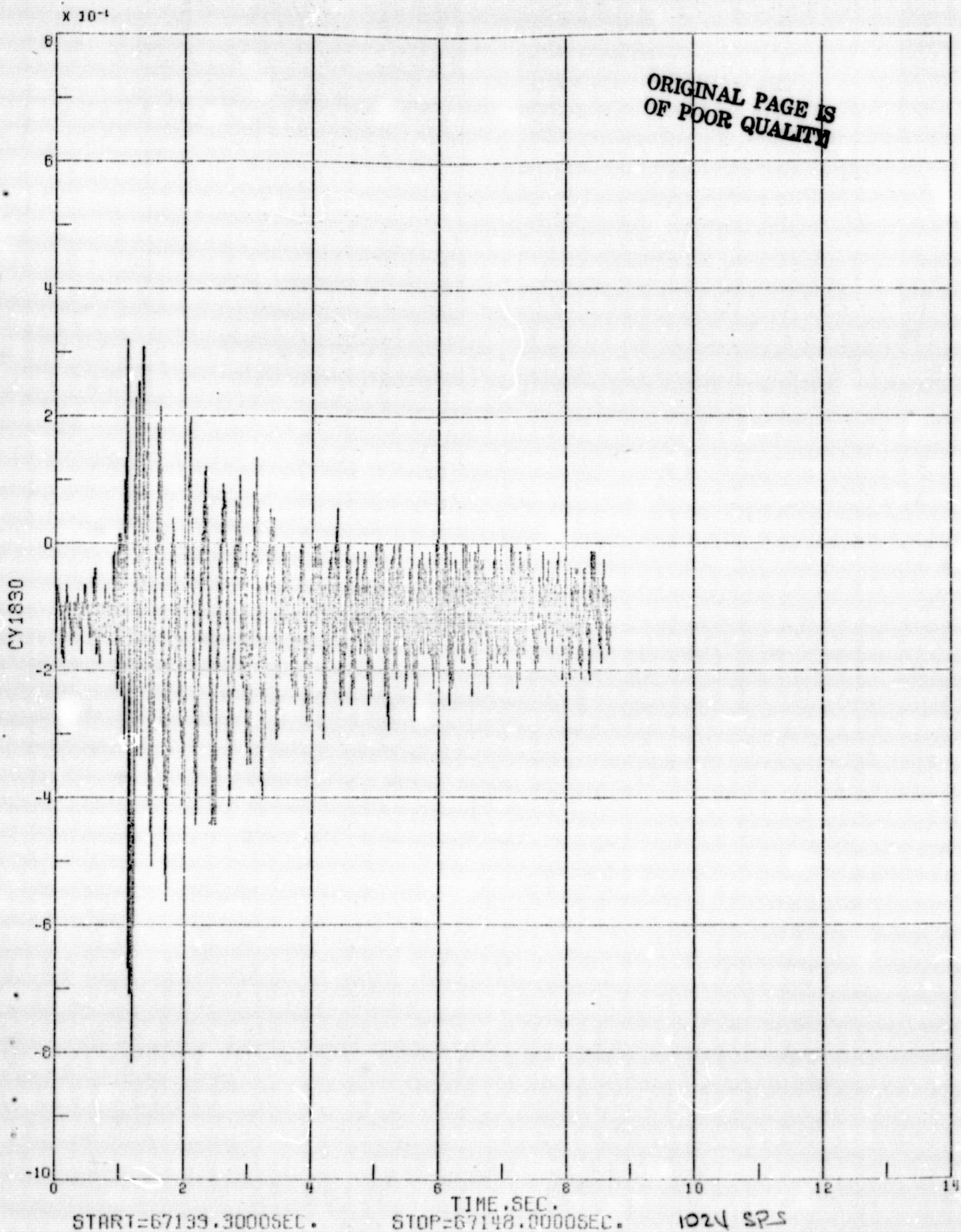
SHOCK SPECTRUM



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 VIKING B LI FT-OFF 1024 SPS 9/ CY1820

4.15

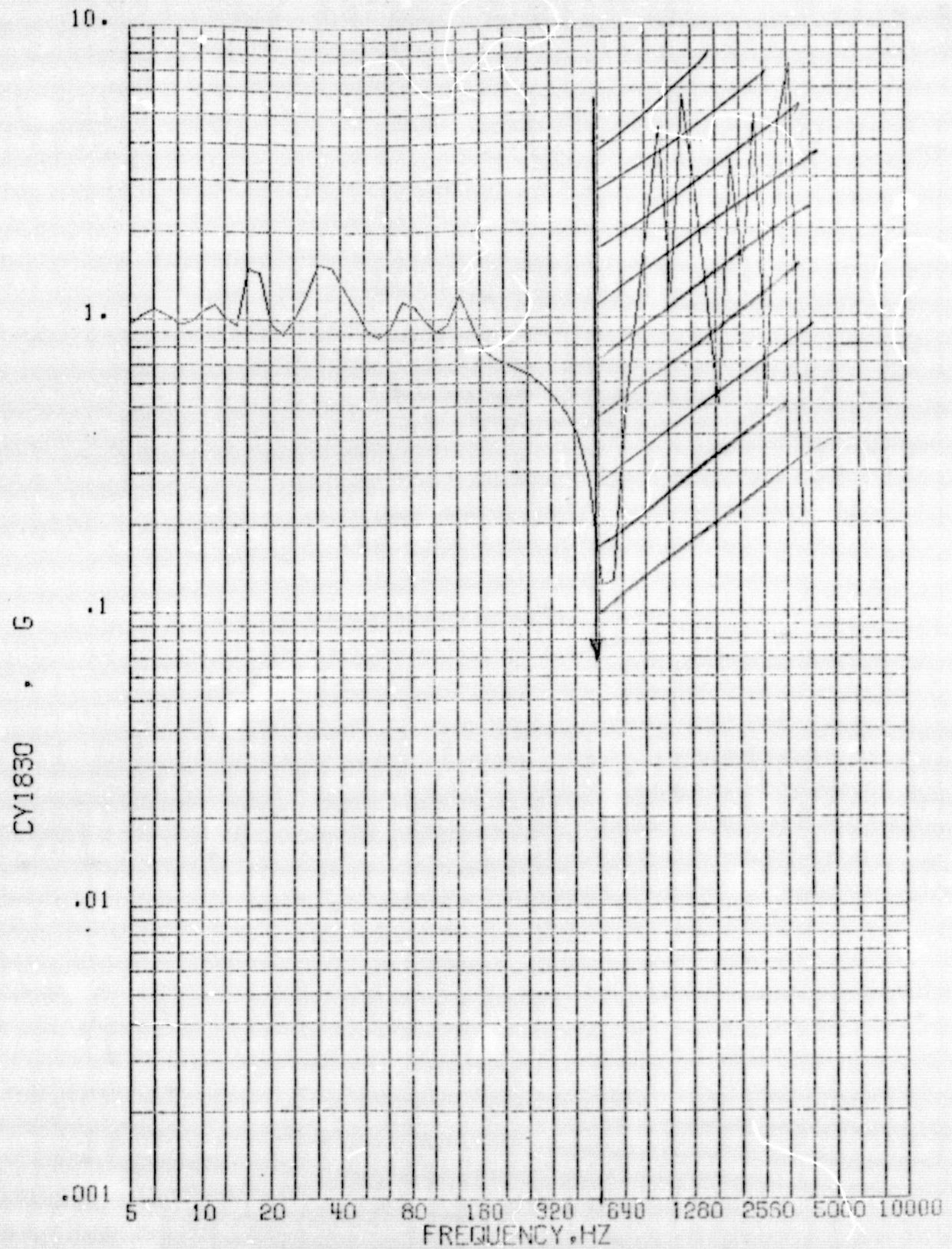
Figure 4.6b



4.16a

Figure 4.7a

SHOCK SPECTRUM



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STOP=67148.9000SEC.

Q=10.

VIKING B

L1 FT-OFF 1024 SPS

S/ CY1830

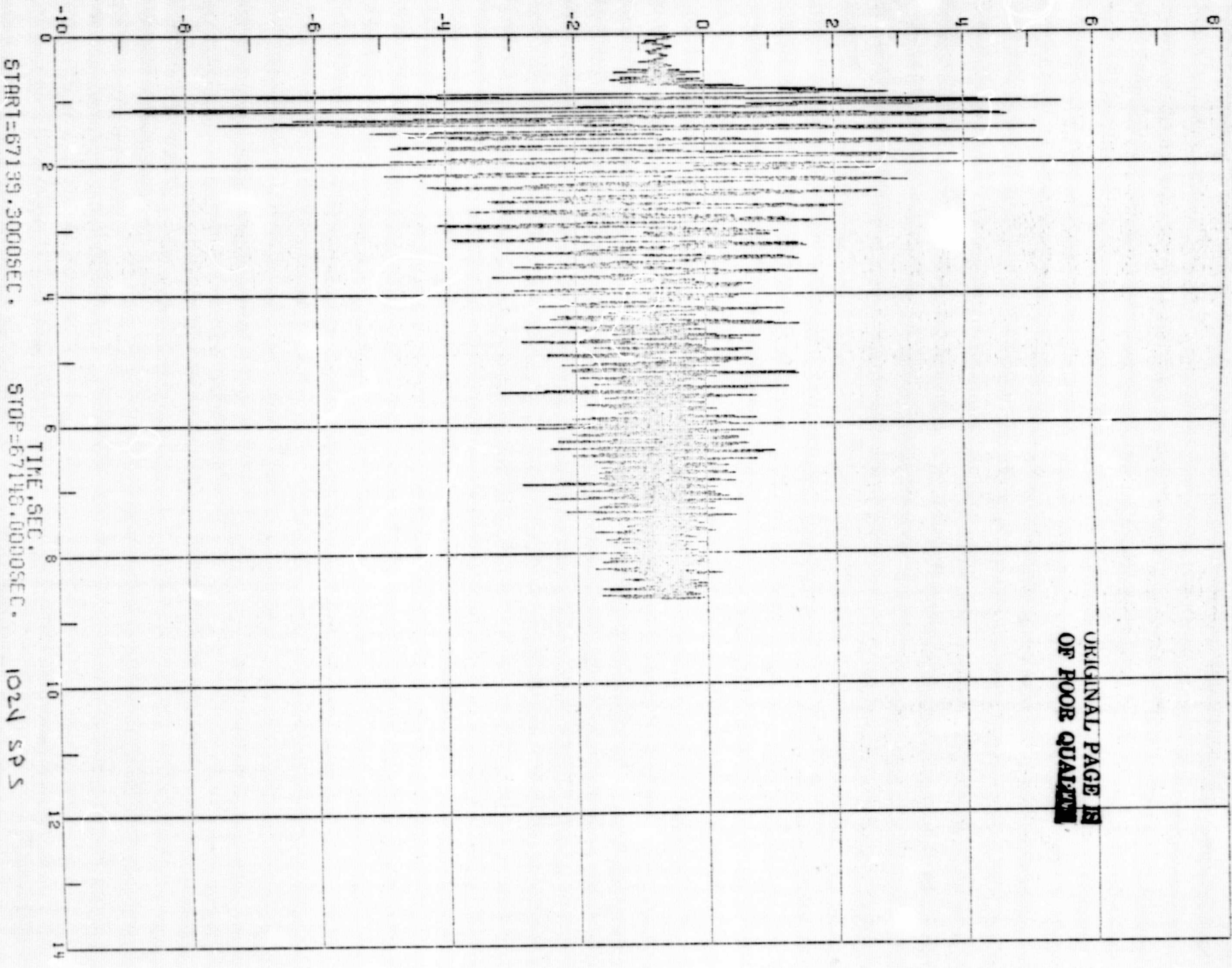
4.17

Figure 4. 7b

X 10⁻¹

CY1840

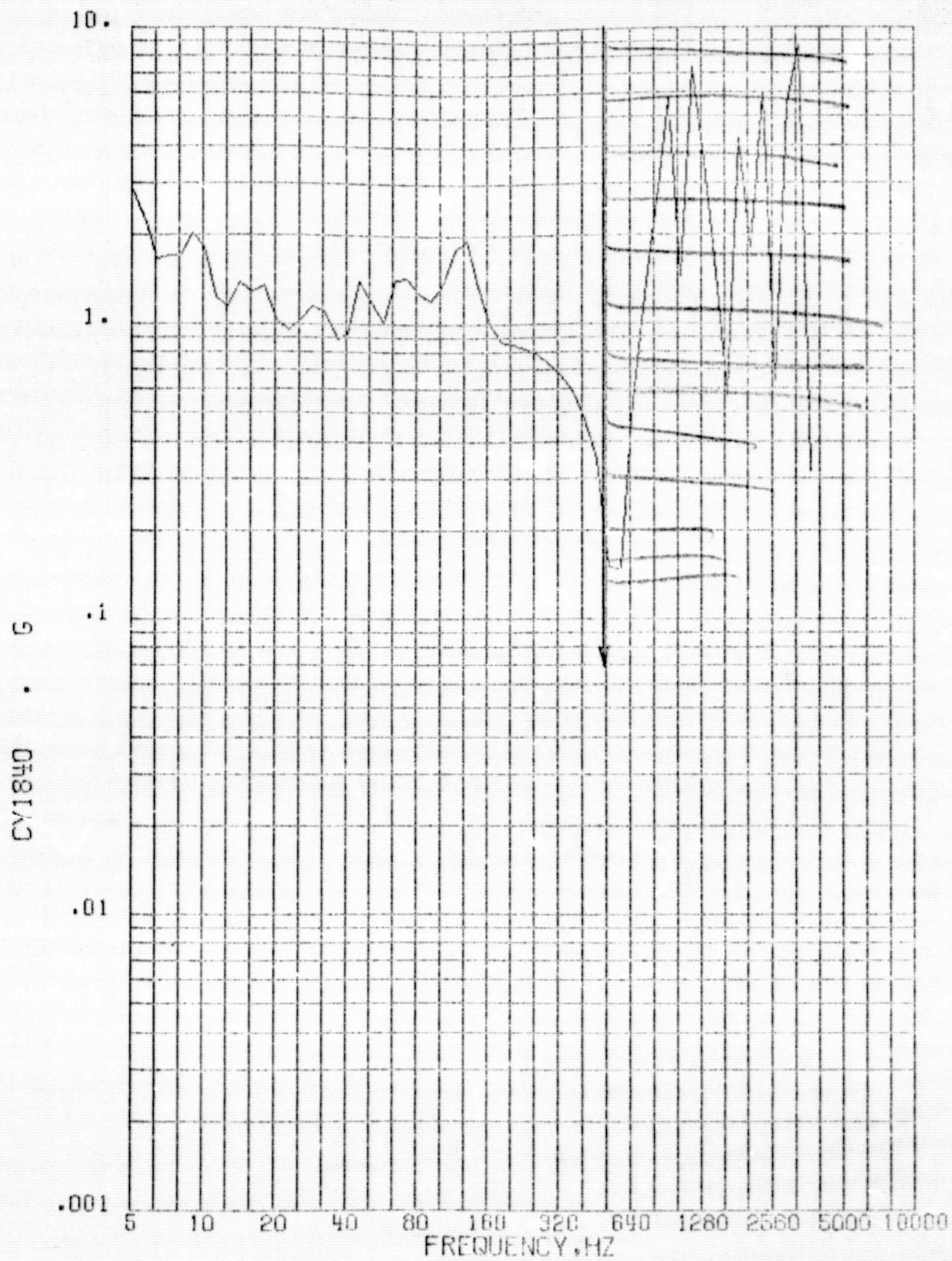
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OF POOR QUALITY



4.18

Figure 4.8a

SHOCK SPECTRUM



START=67139.8000SEC.

STOP=67148.0000SEC.

Q=10.

VIKING B

LIFT-OFF

1024 SPS

9/ CY1840

4.196

Figure 4. 8b

CY1850

X 10⁻¹

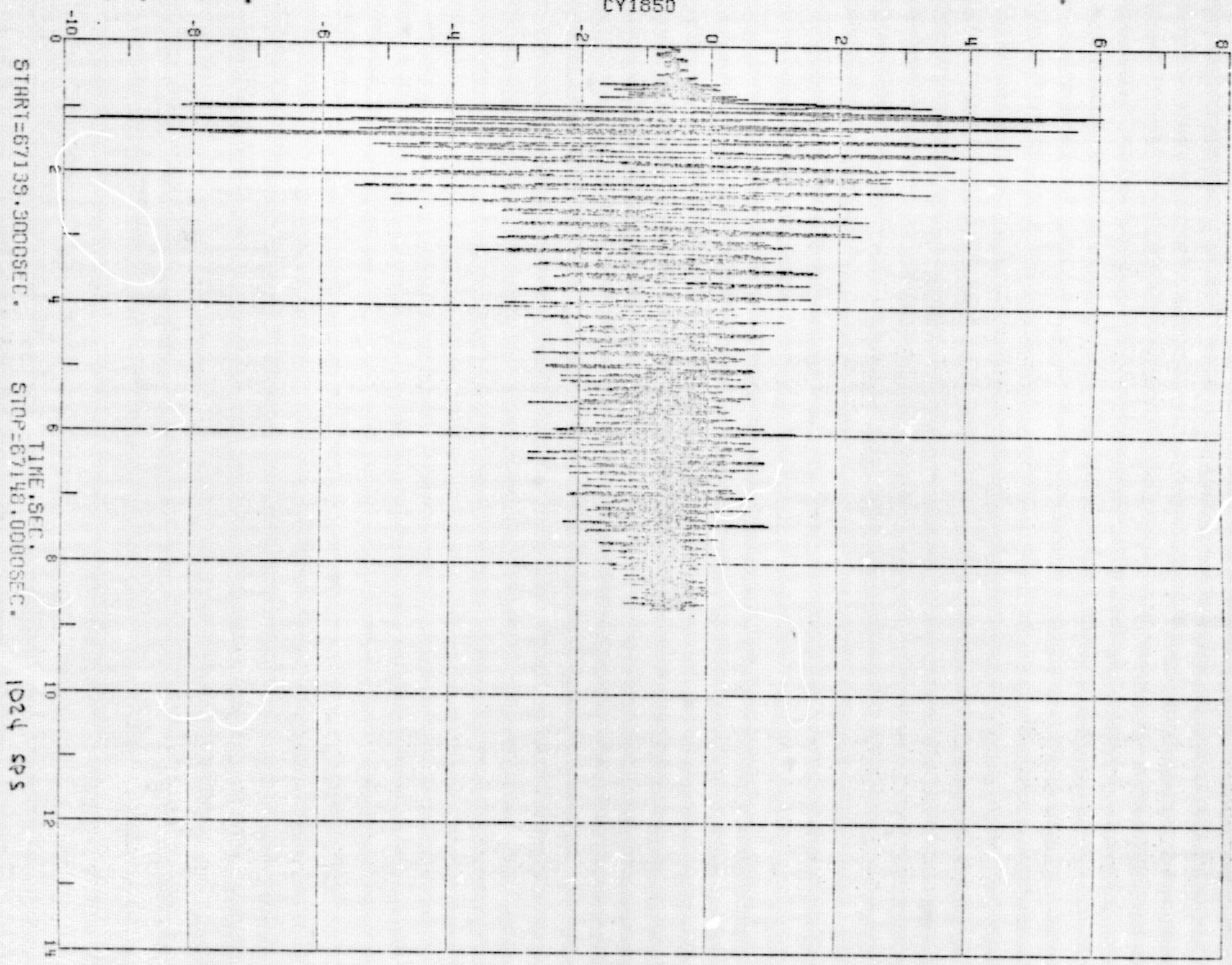
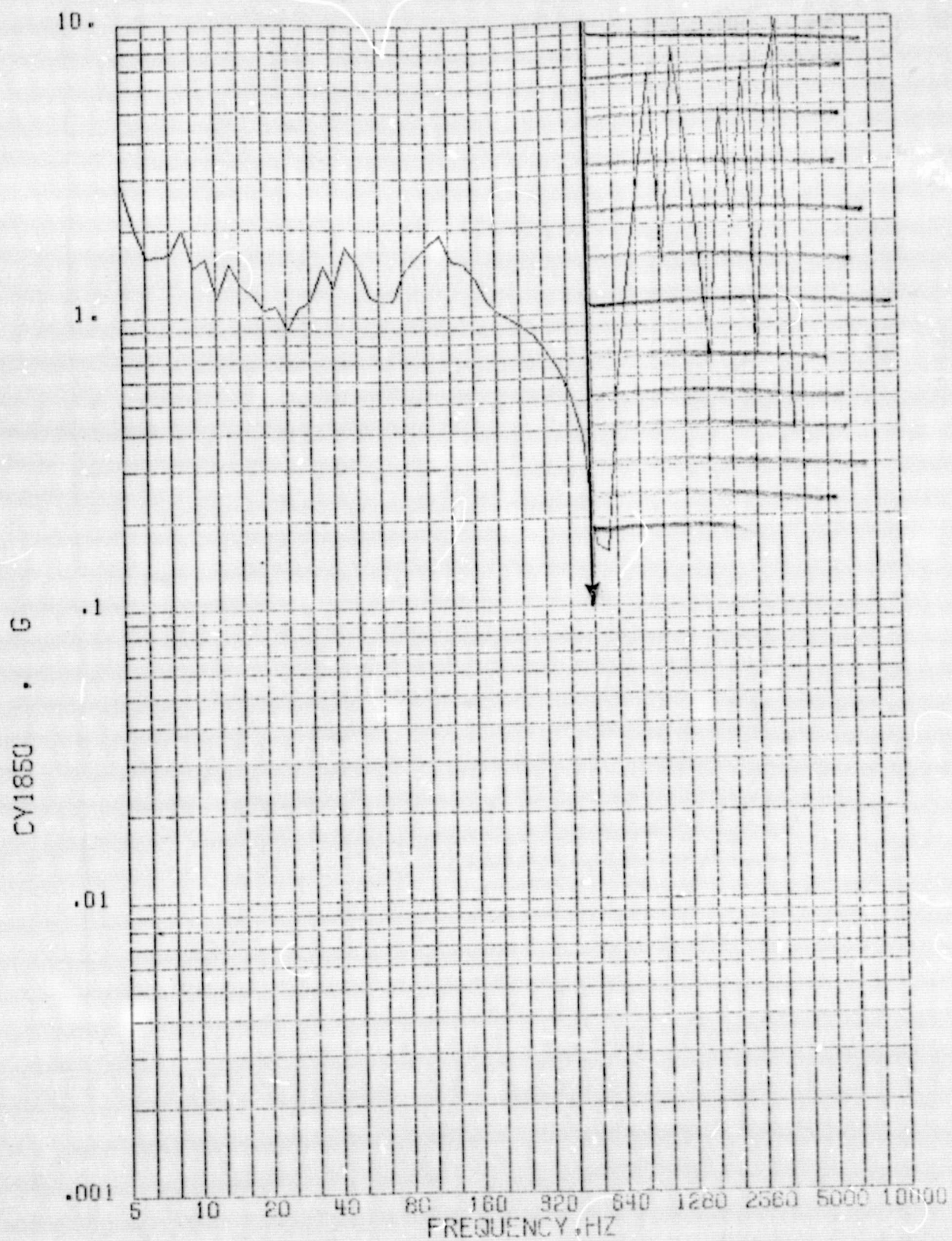


Figure 4. 9a

SHOCK SPECTRUM



START=67139.0000SEC.

STOP=67148.0000SEC.

Q=10.

VIKING B

LI FT-OFF

1024 SPS

9/ CY1850

4.21

Figure 4.9b

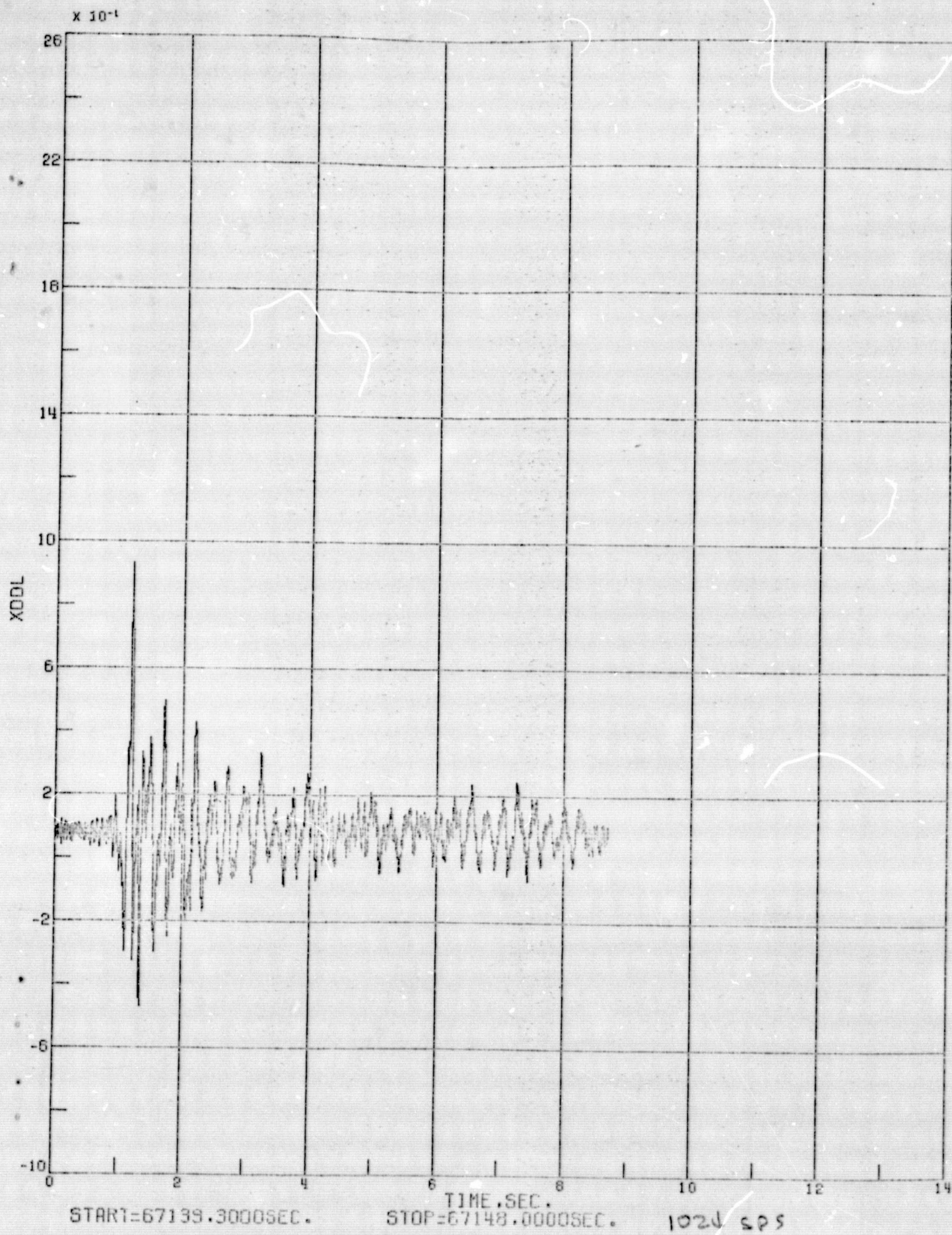
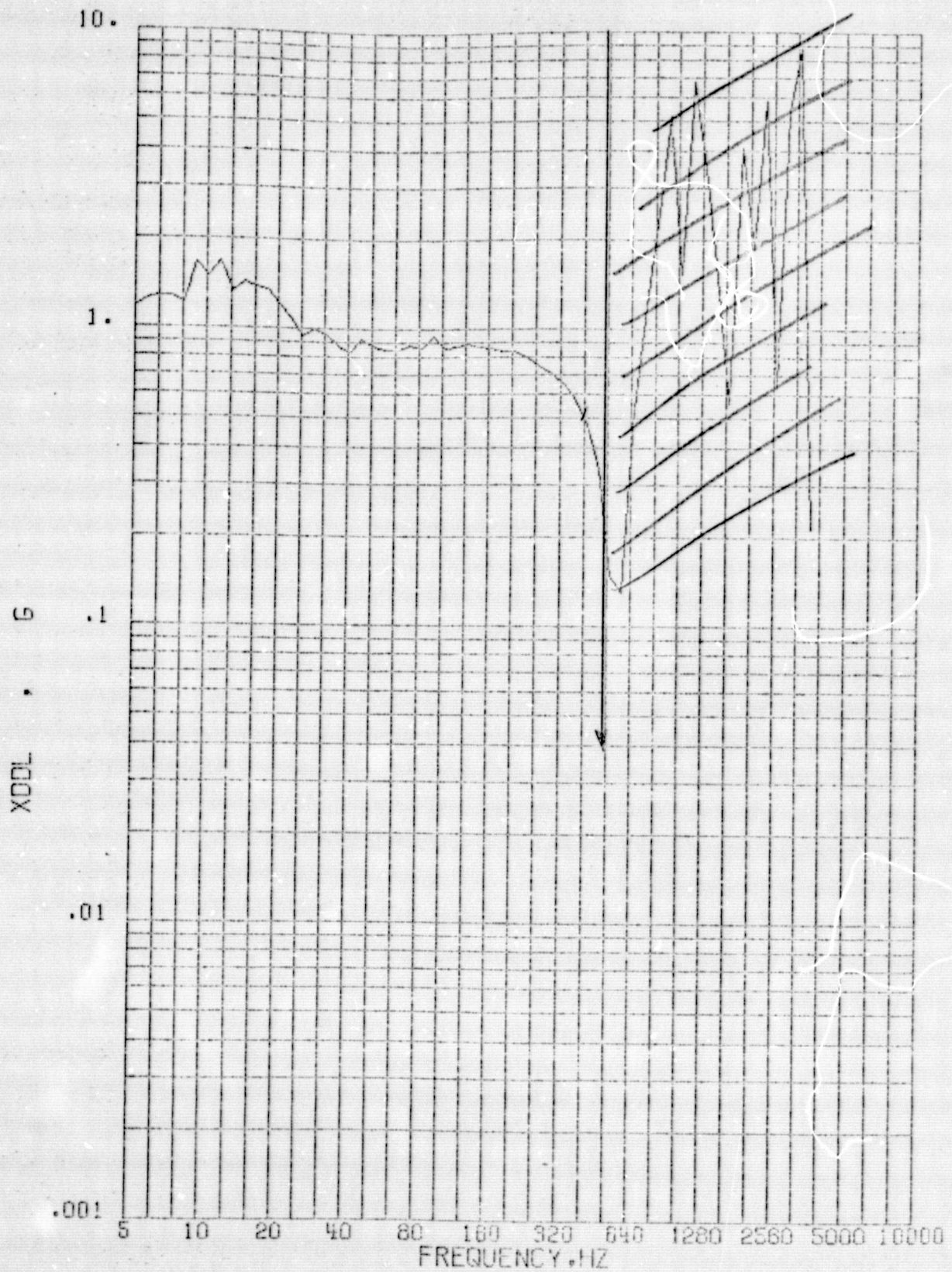


Figure 4.10a

SHOCK SPECTRUM



START=67139.0000SEC.

STOP=67148.0000SEC.

Q=10.

VIKING B

LI FT-OFF 1024 SPS

9/

XDDL

4.23

Figure 4.10b

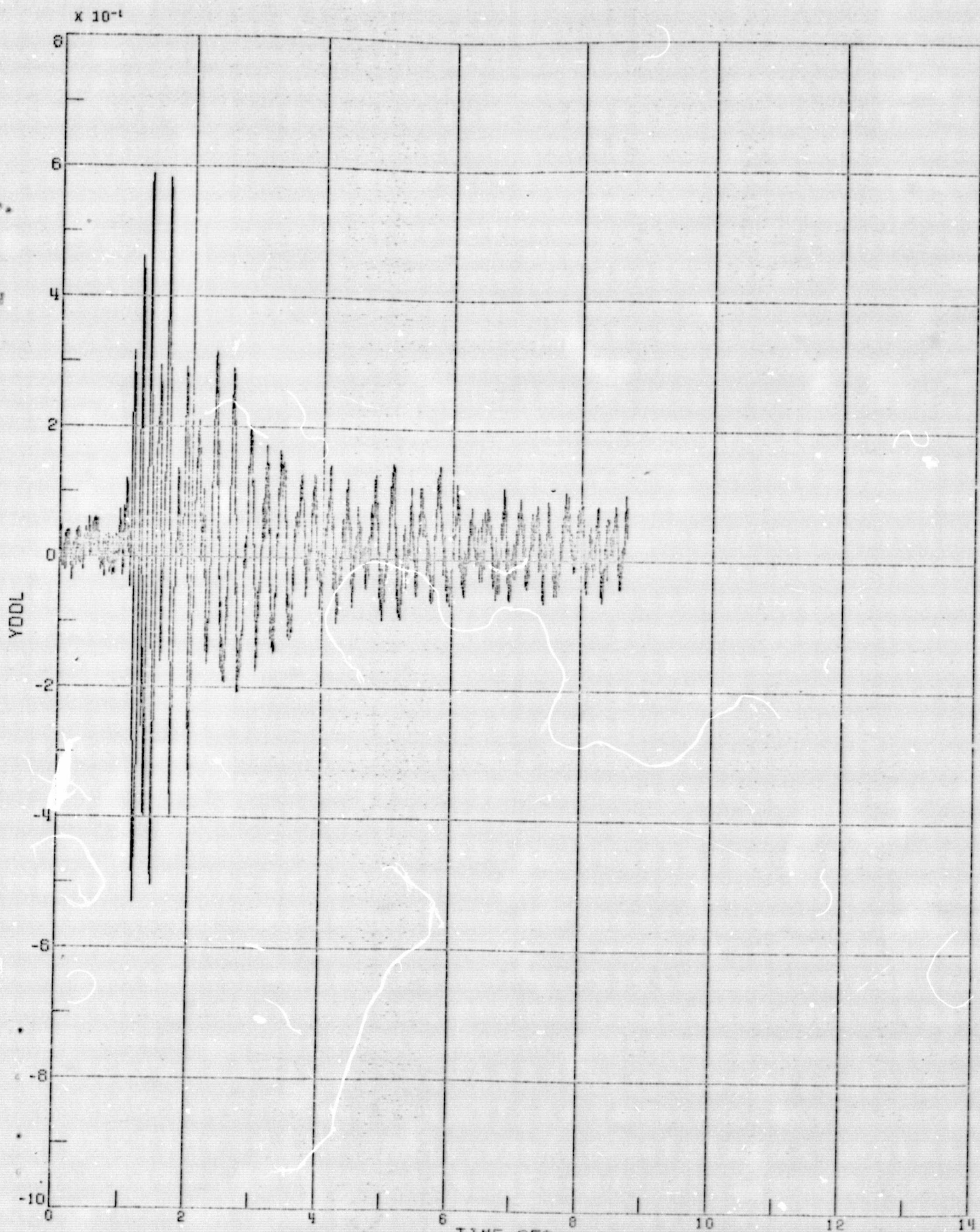
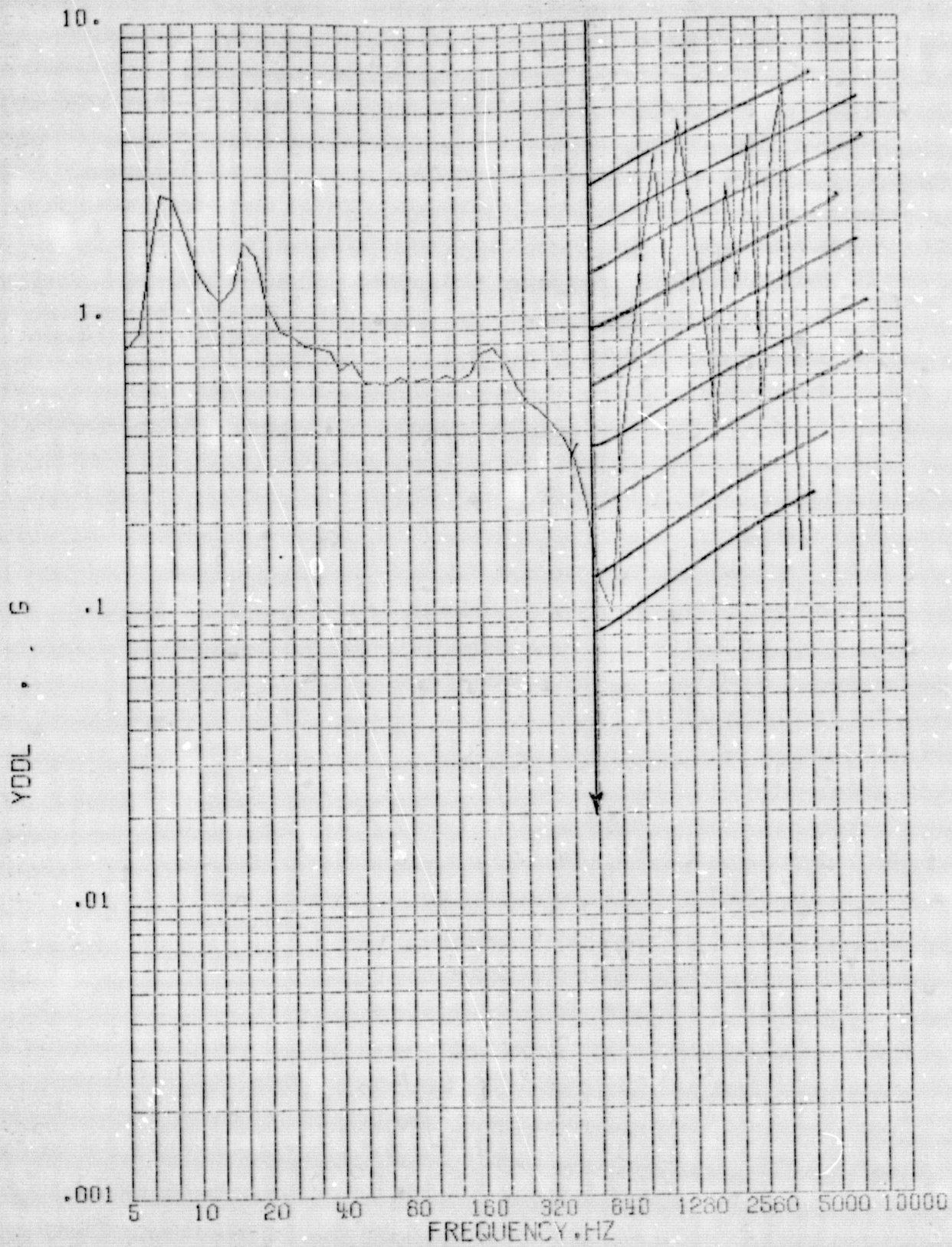


Figure 4.11a

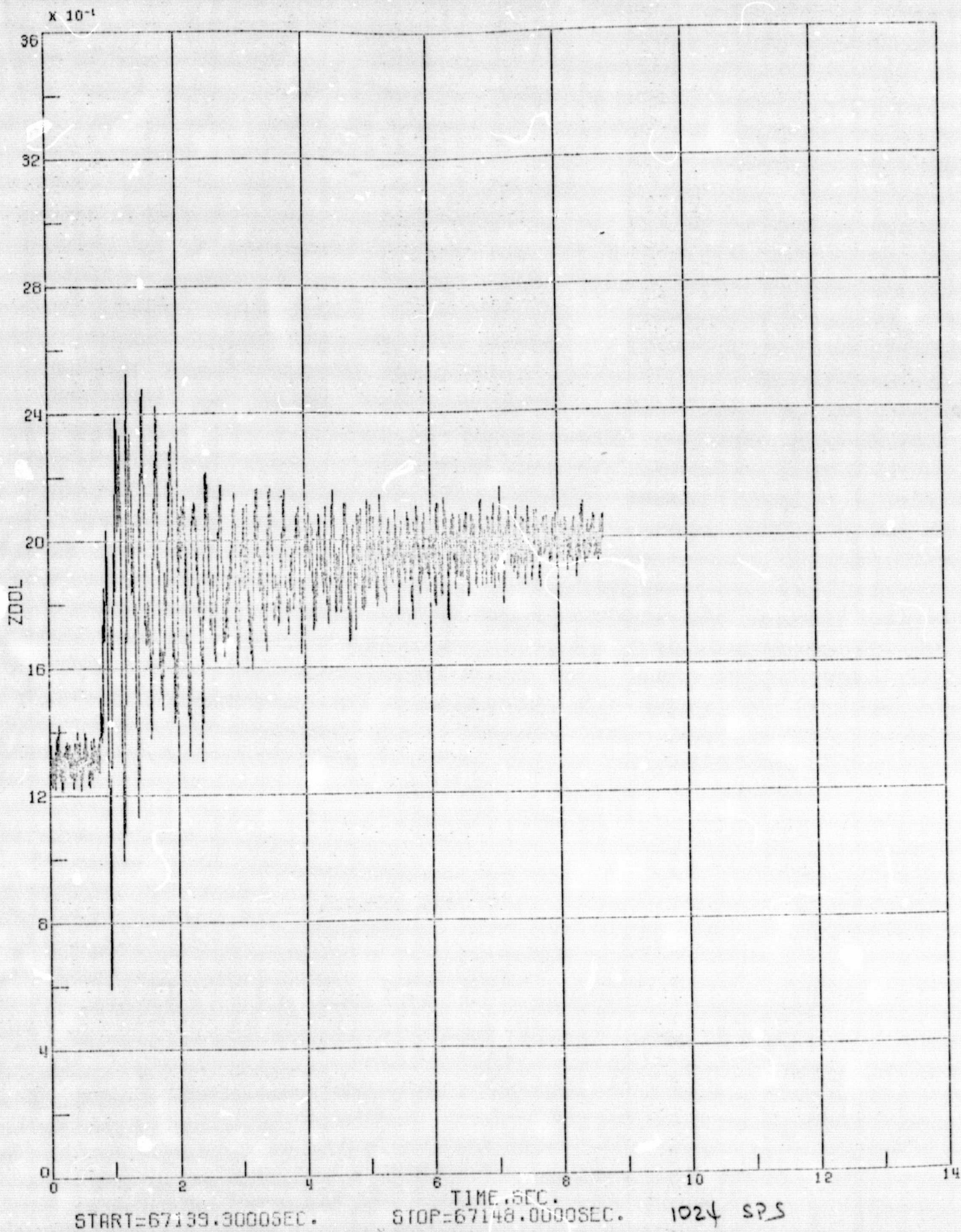
SHOCK SPECTRUM



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 VIKING B LI FT-OFF 1024 SPS 9/ YDDL

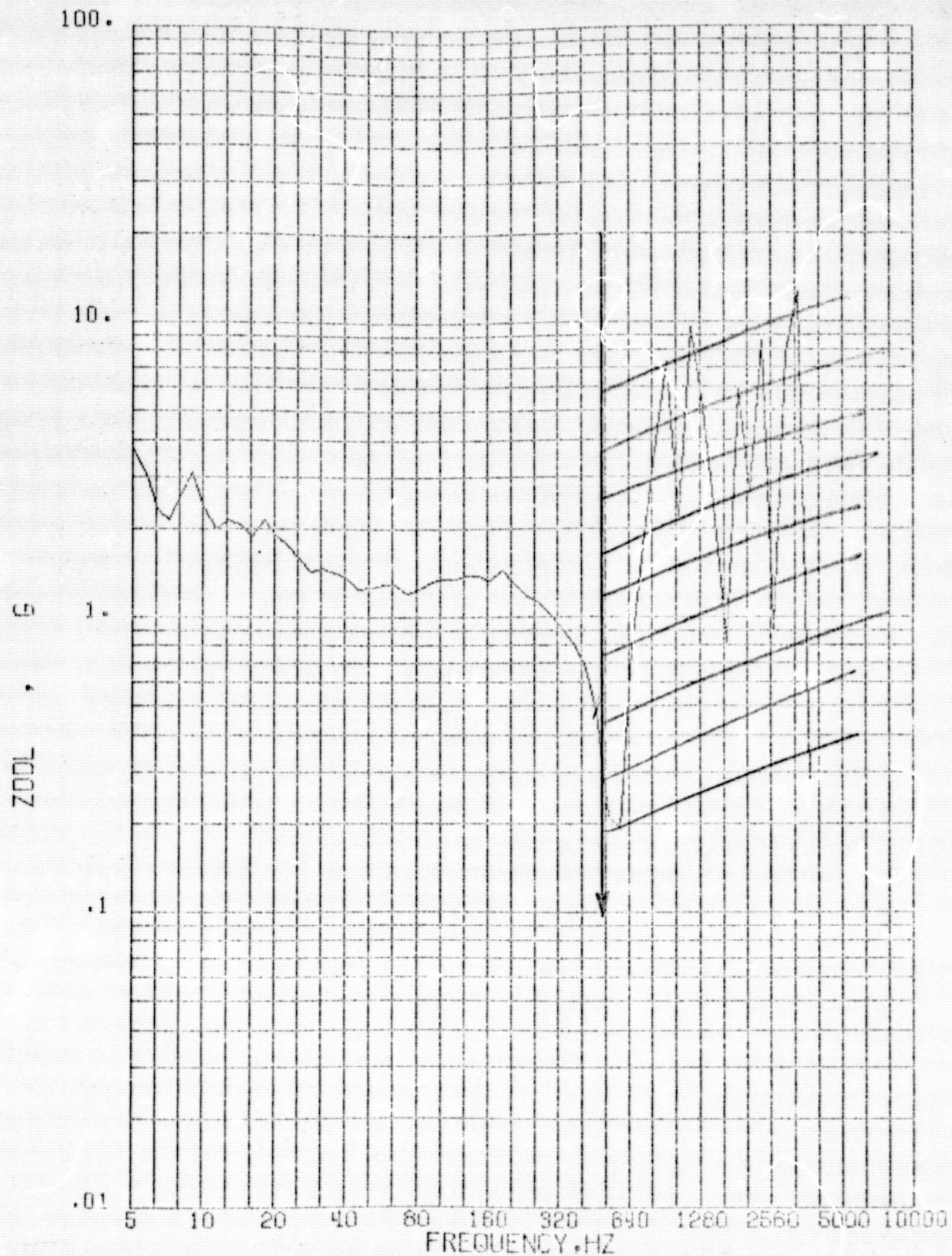
4.25

Figure 4.11b



426

Figure 4.12a



START: 67139.8000SEC.

STOP: 67148.0000SEC.

Q=10.

VIKING B

LI FT-OFF

1024 SPS

9/

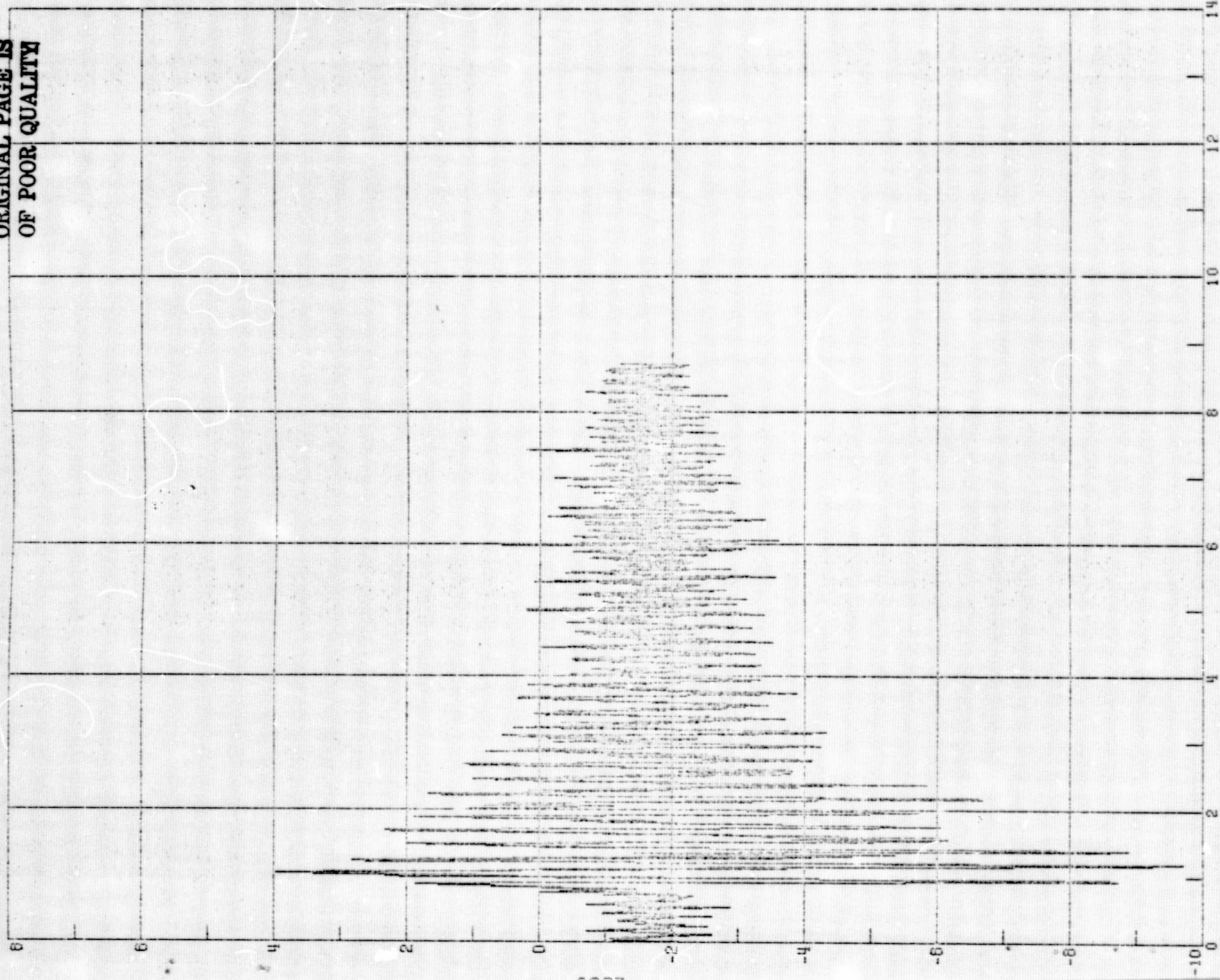
ZDDL

4.27

Figure 4.12b

$\times 10^{-1}$

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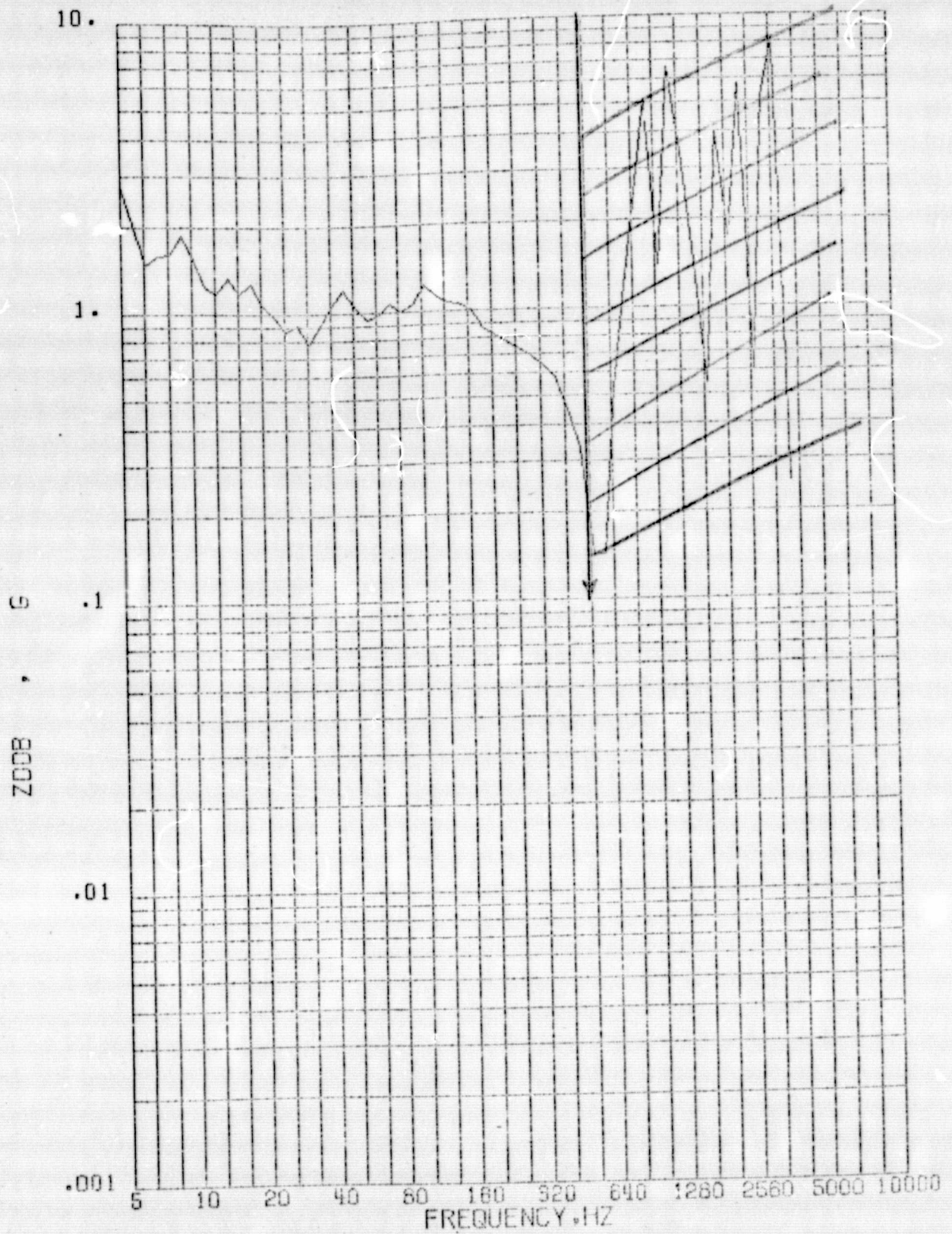


9007

START=67139.3000SEC. TIME, SEC. STOP=67148.0000SEC. 1024 SPS

4.20.29

SHOCK SPECTRUM



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STOP=67148.0000SEC.

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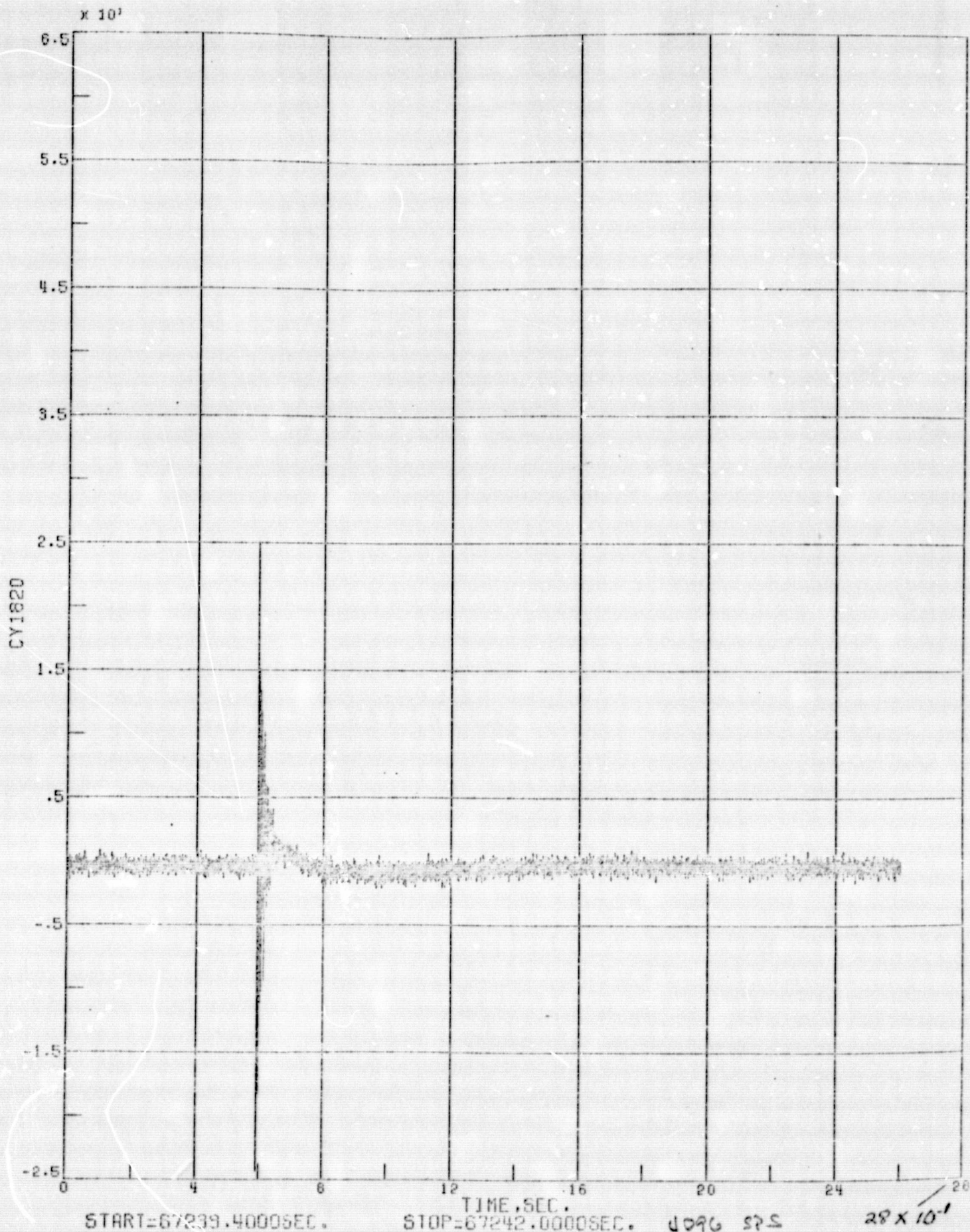
VIKING B

LI FT-OFF 1024 SPS

9/ ZOOB

4.29 b

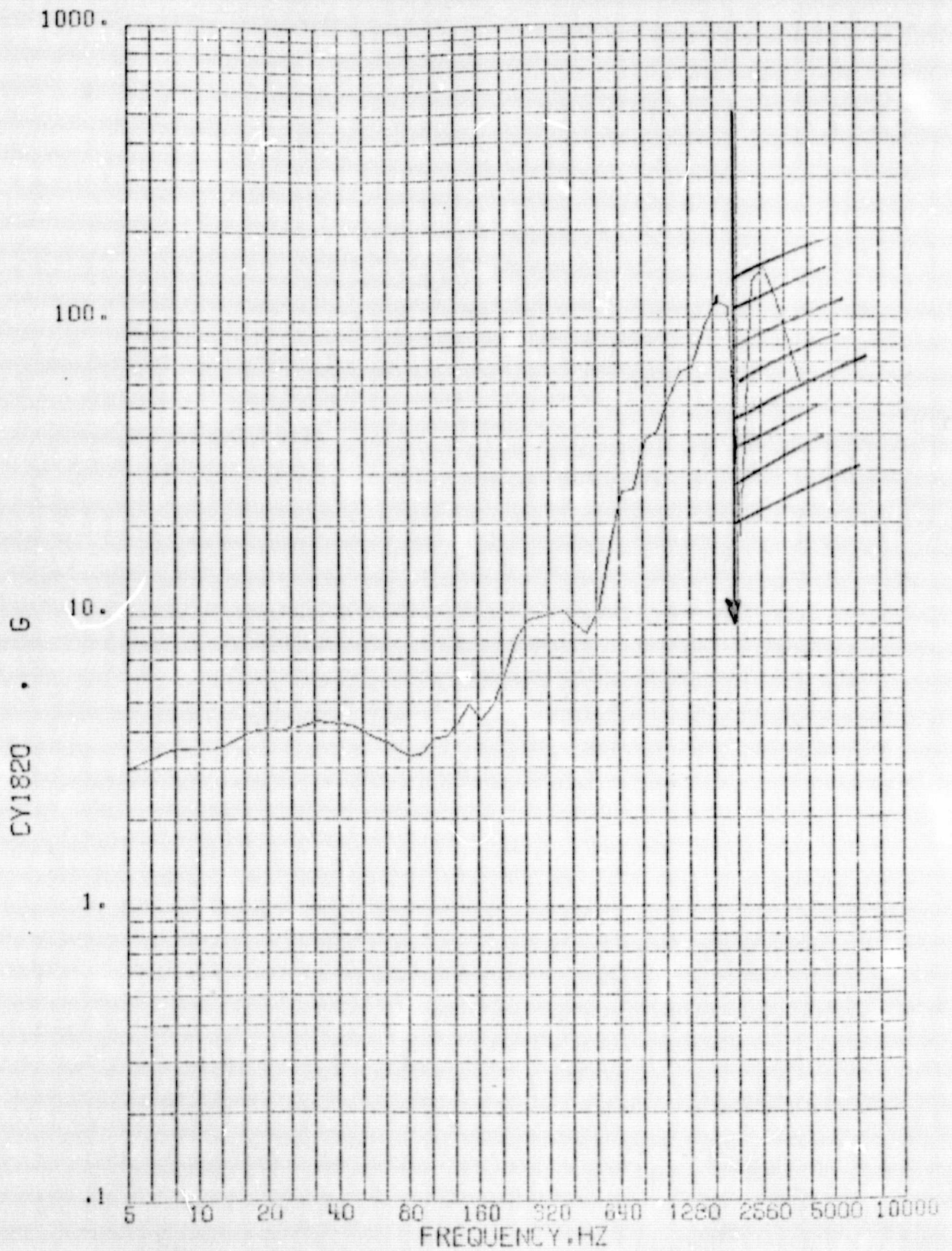
Figure 4.13b



4.149
4.30

Figure 4.14a

SHOCK SPECTRUM



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STOP=67242.0000SEC.

Q=10.

VIKING B

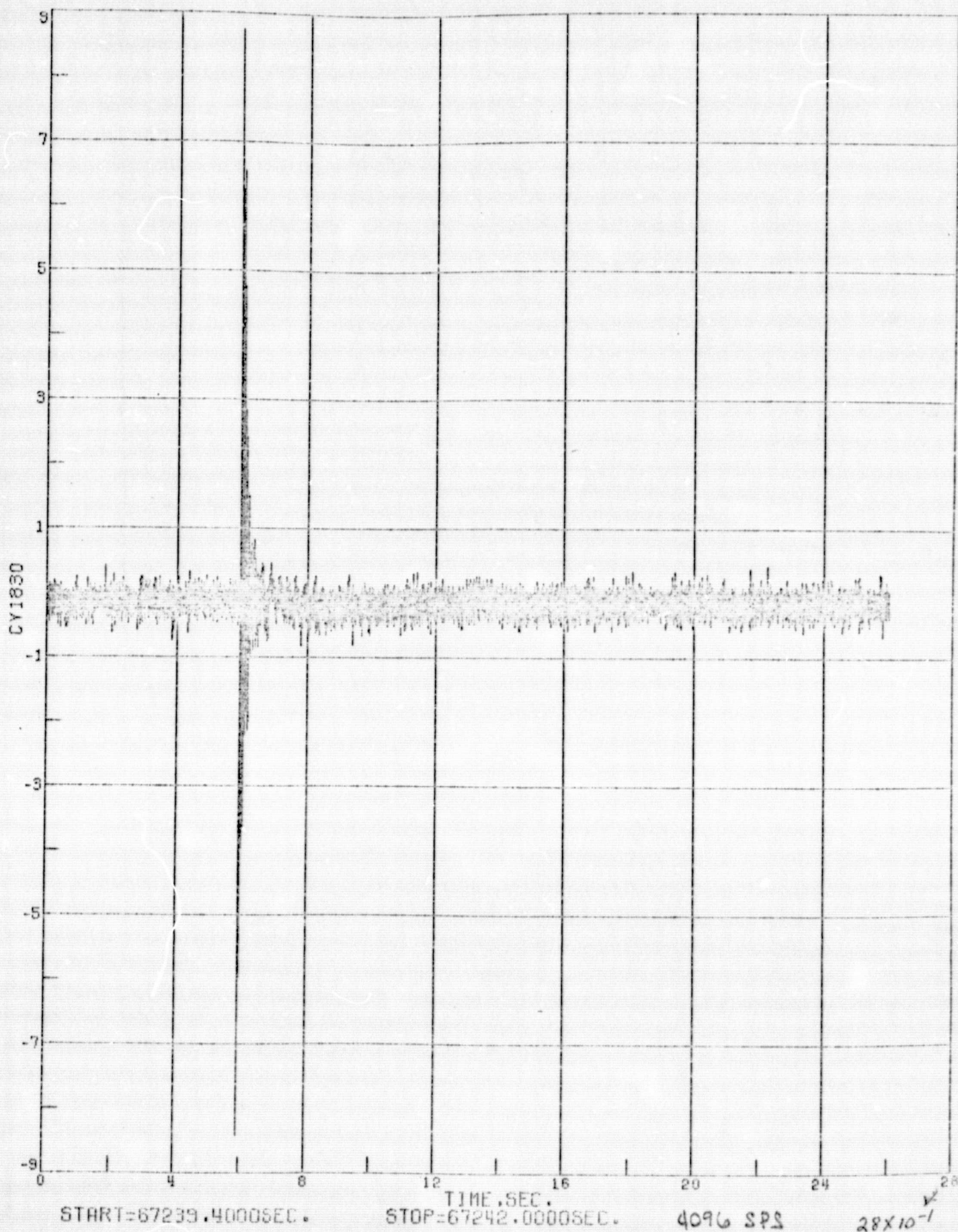
FB R RELEASE

4096 SPS

CY1820

4.14 4.31

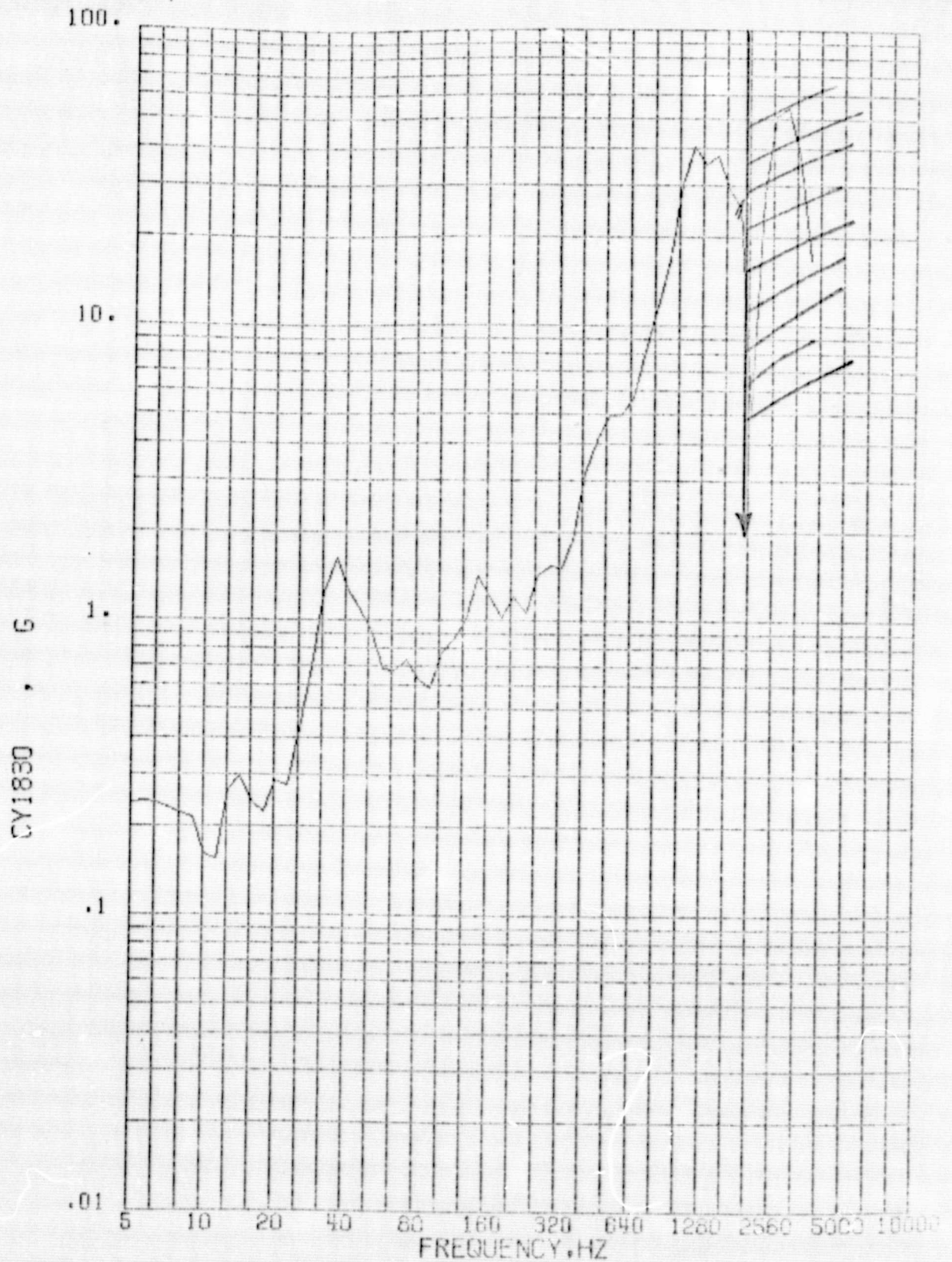
Figure 4.14b



4.15 4.32

Figure 4.15a

SHOCK SPECTRUM



START=67239.9000SEC.

STOP=67242.0000SEC.

Q=10.

VIKING B

FB R RELEASE

4696 SPS

CY1830

4.154.33

Figure 4.15b

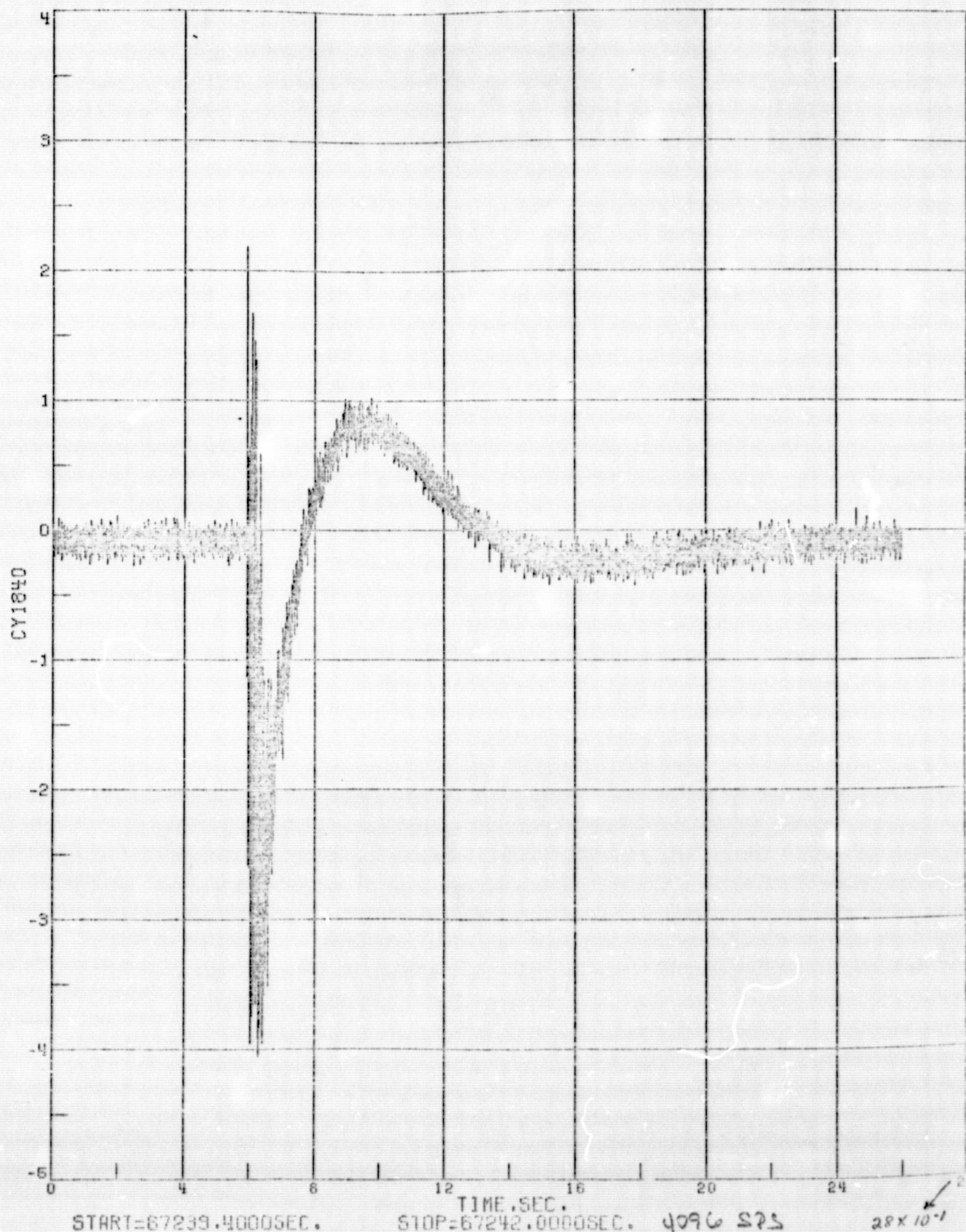
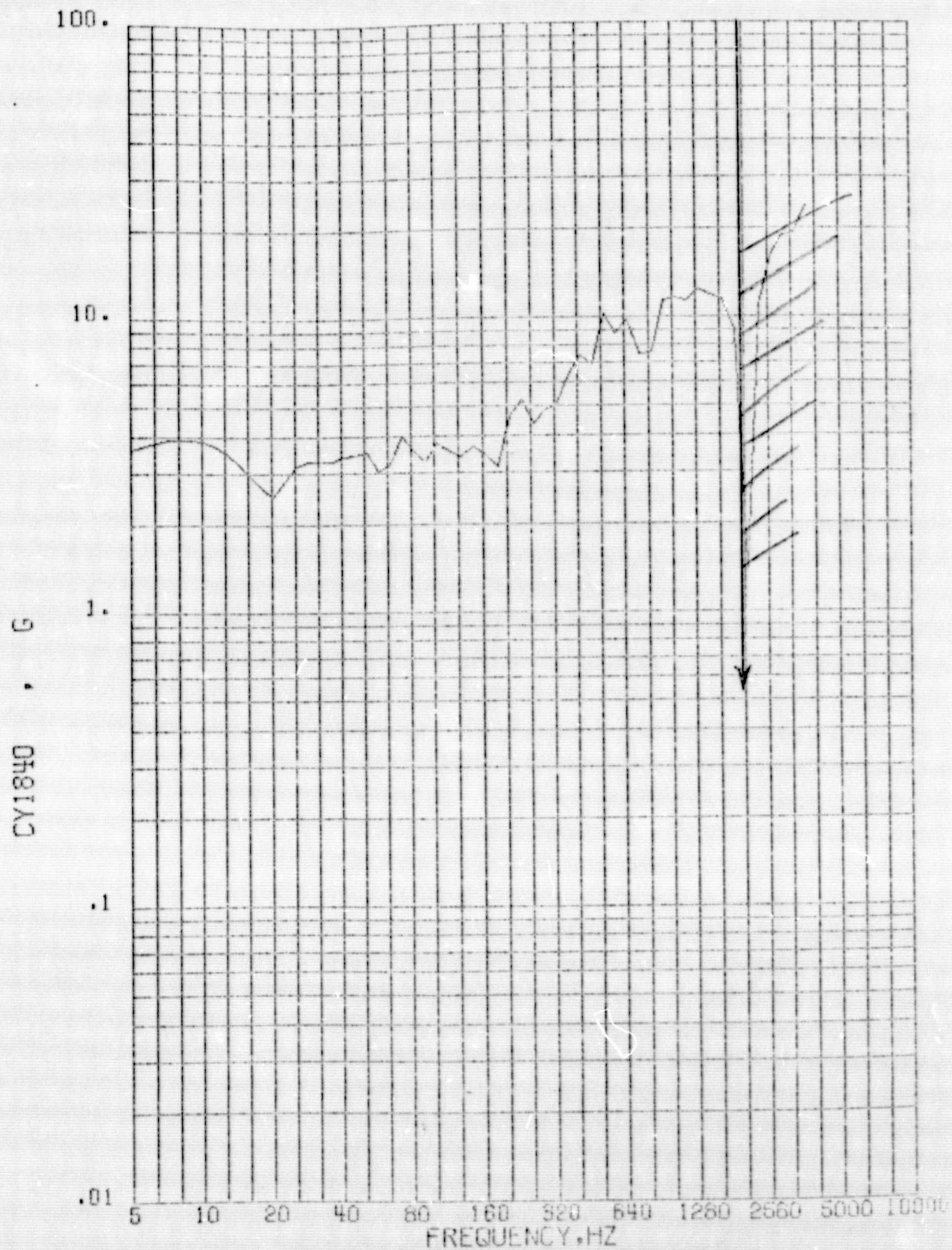


Figure 4.16a

SHOCK SPECTRUM



START=67233.9000SEC.

STOP=67242.0000SEC.

Q=10.

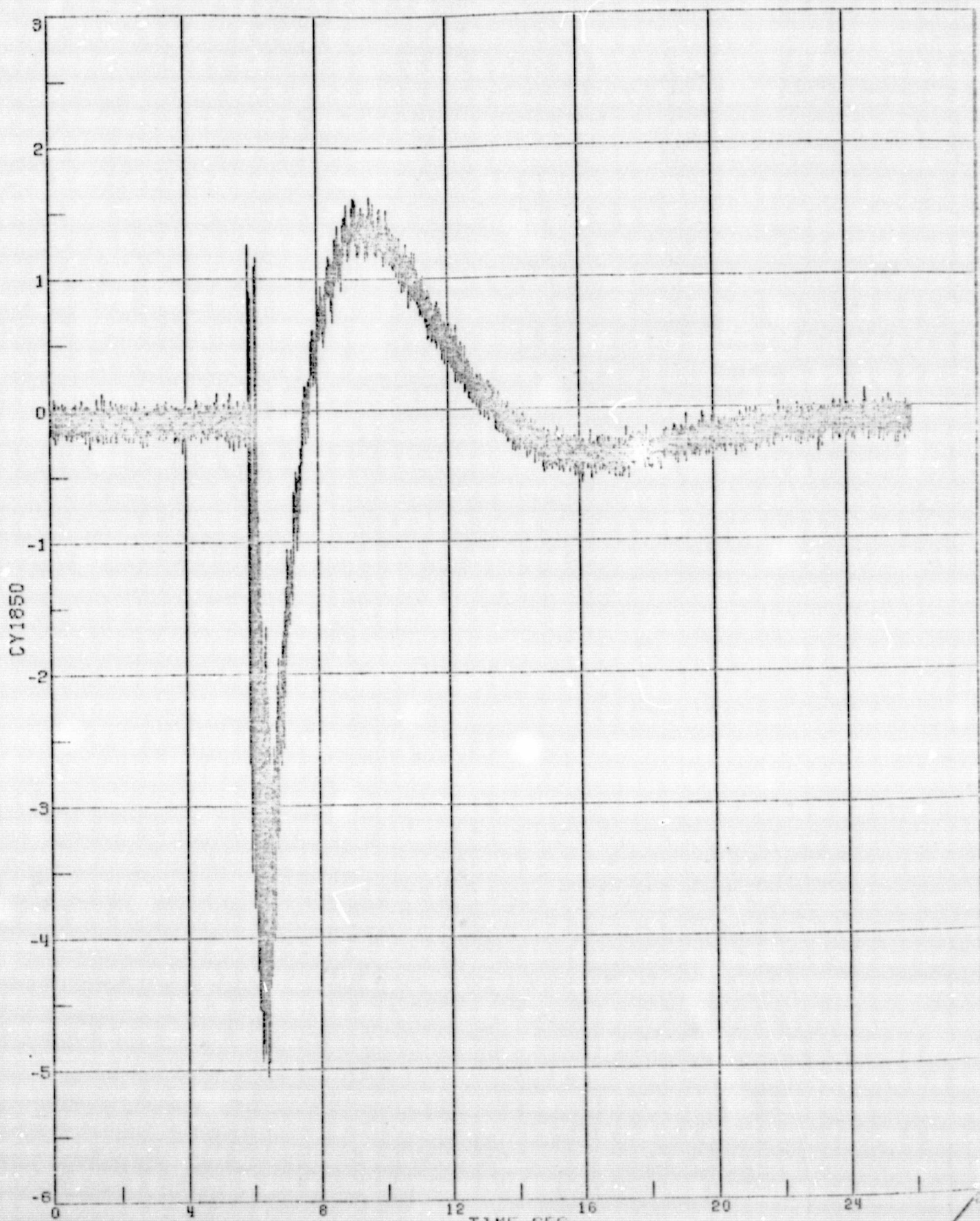
VIKING B

FB R RELEASE 4096 SPS

CY1840

4.4.35

Figure 4.16b



START=67239.4000SEC.

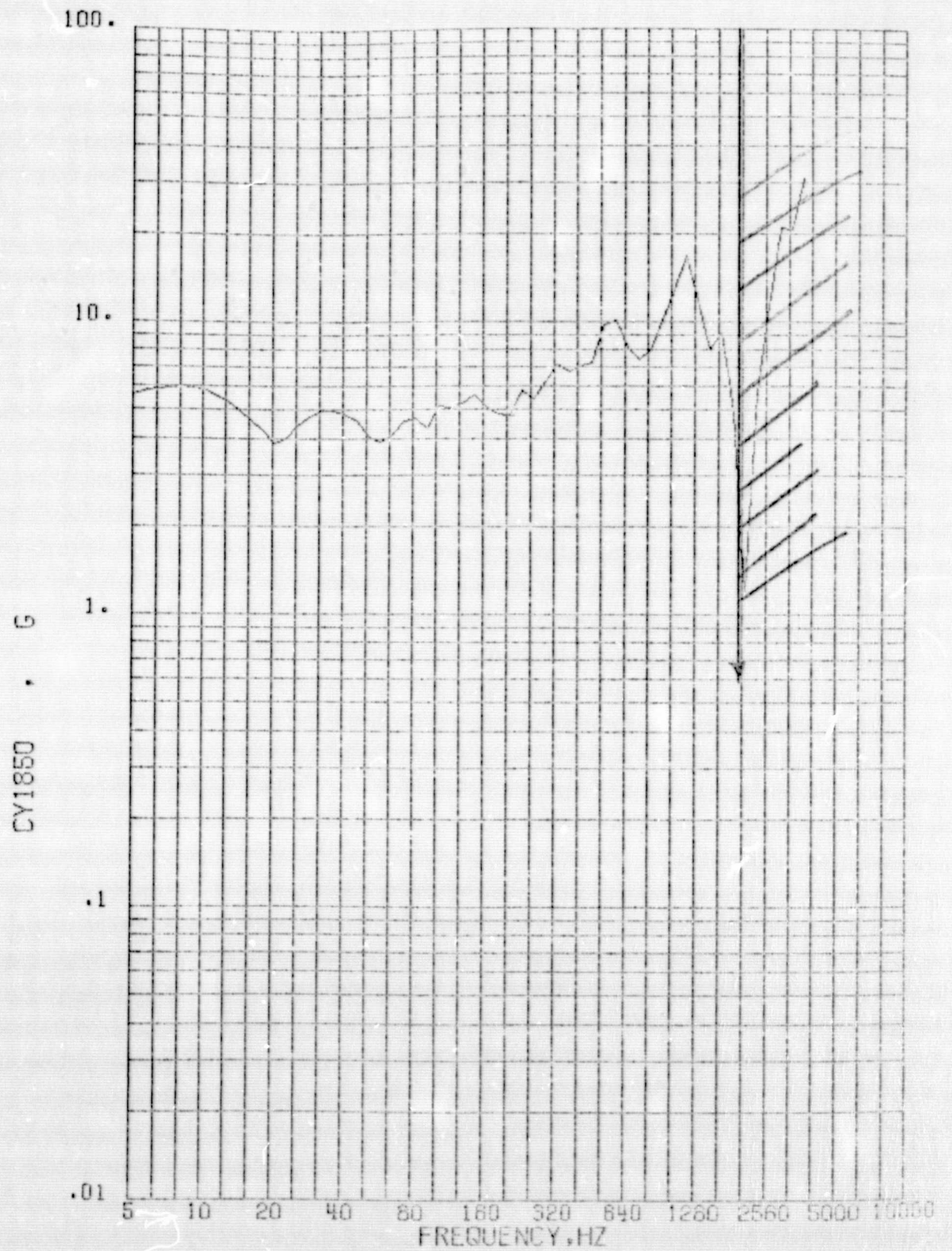
STOP=67242.0000SEC. 4096 SPS

28×10^{-1}

(4.36)

Figure 4.17a

SHOCK SPECTRUM



START=67239.9000SEC.

STOP=67242.0000SEC.

Q=10.

VIKING B

FB R RELEASE

4096 SPS

CY1850

4.376

Figure 4.17b

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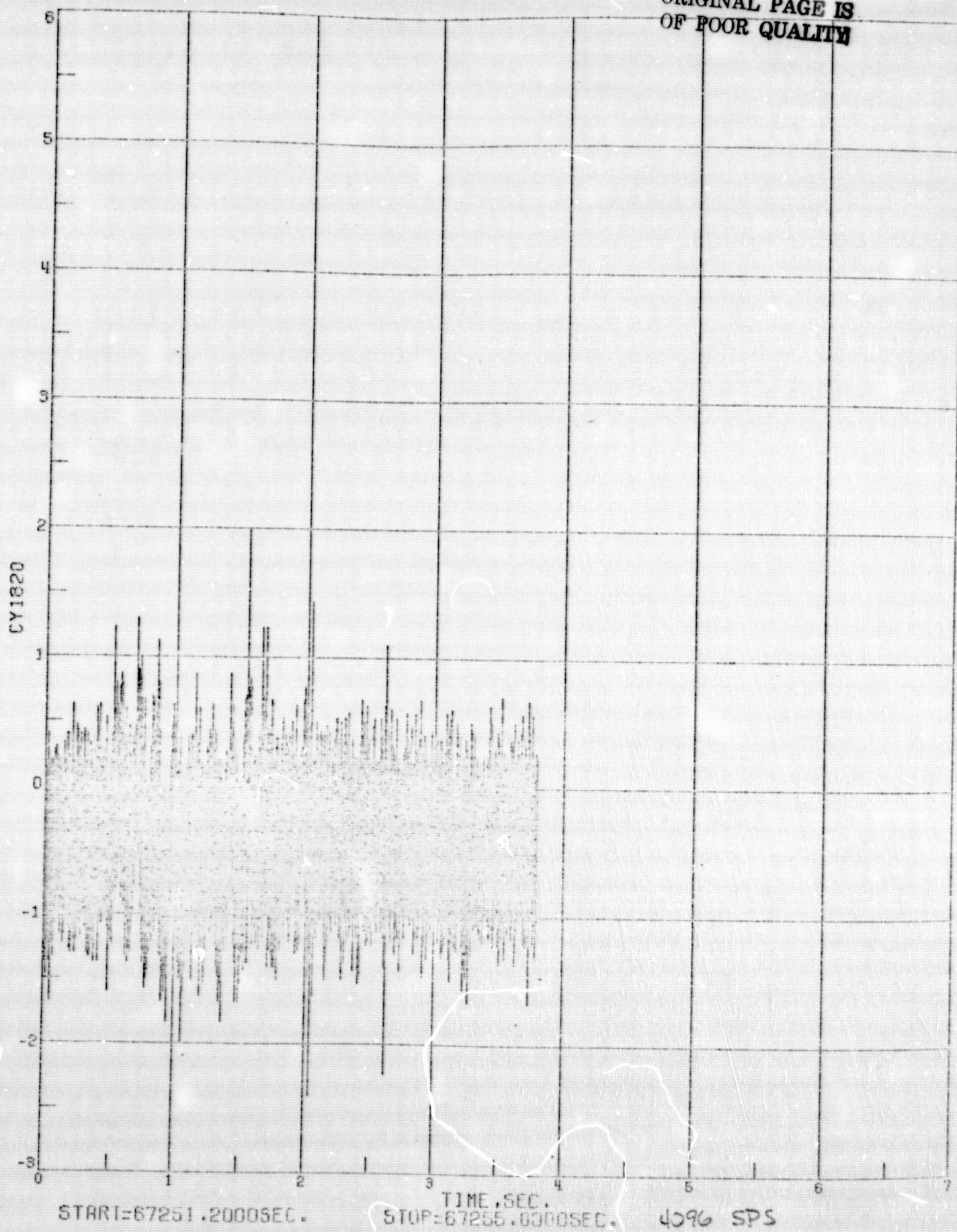
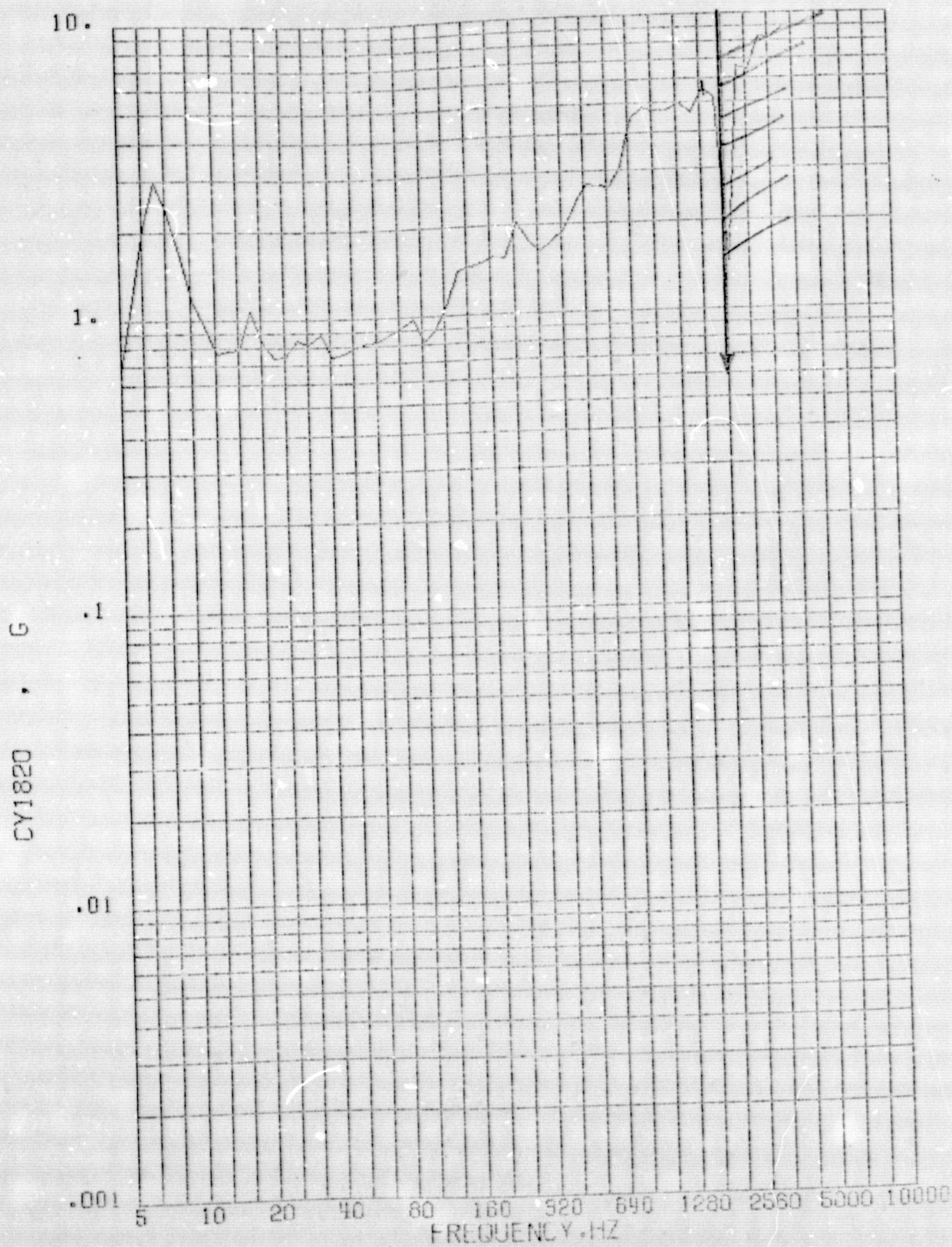


Figure 4.18a

SHOCK SPECTRUM



START=67251.5000SEC.

STOP=67255.0000SEC.

Q=10.

VIKING B

ST G 1 IGN

4096 SPS

CY1820

4.39 b

Figure 4.18b

CY1830

$\times 10^{-1}$

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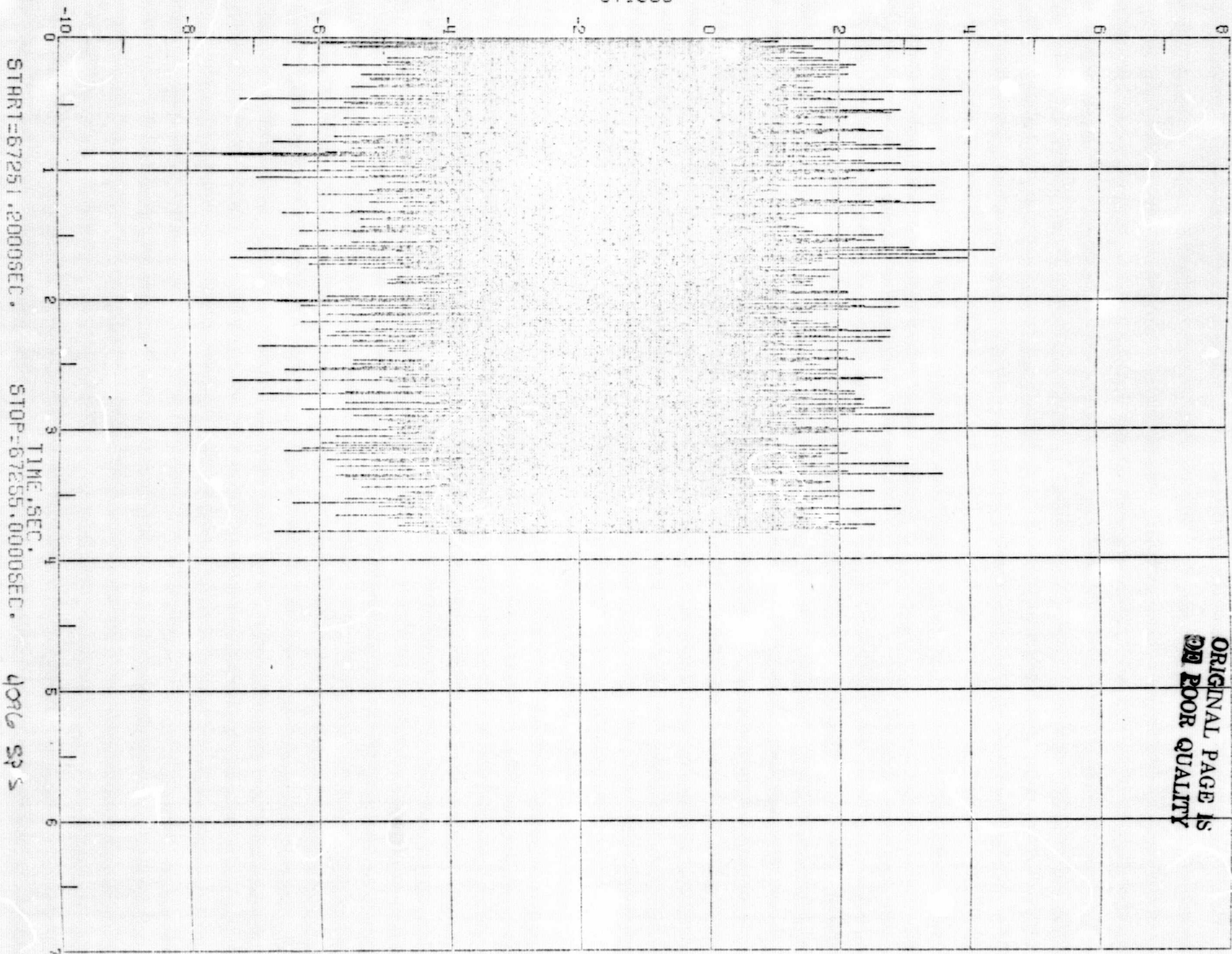
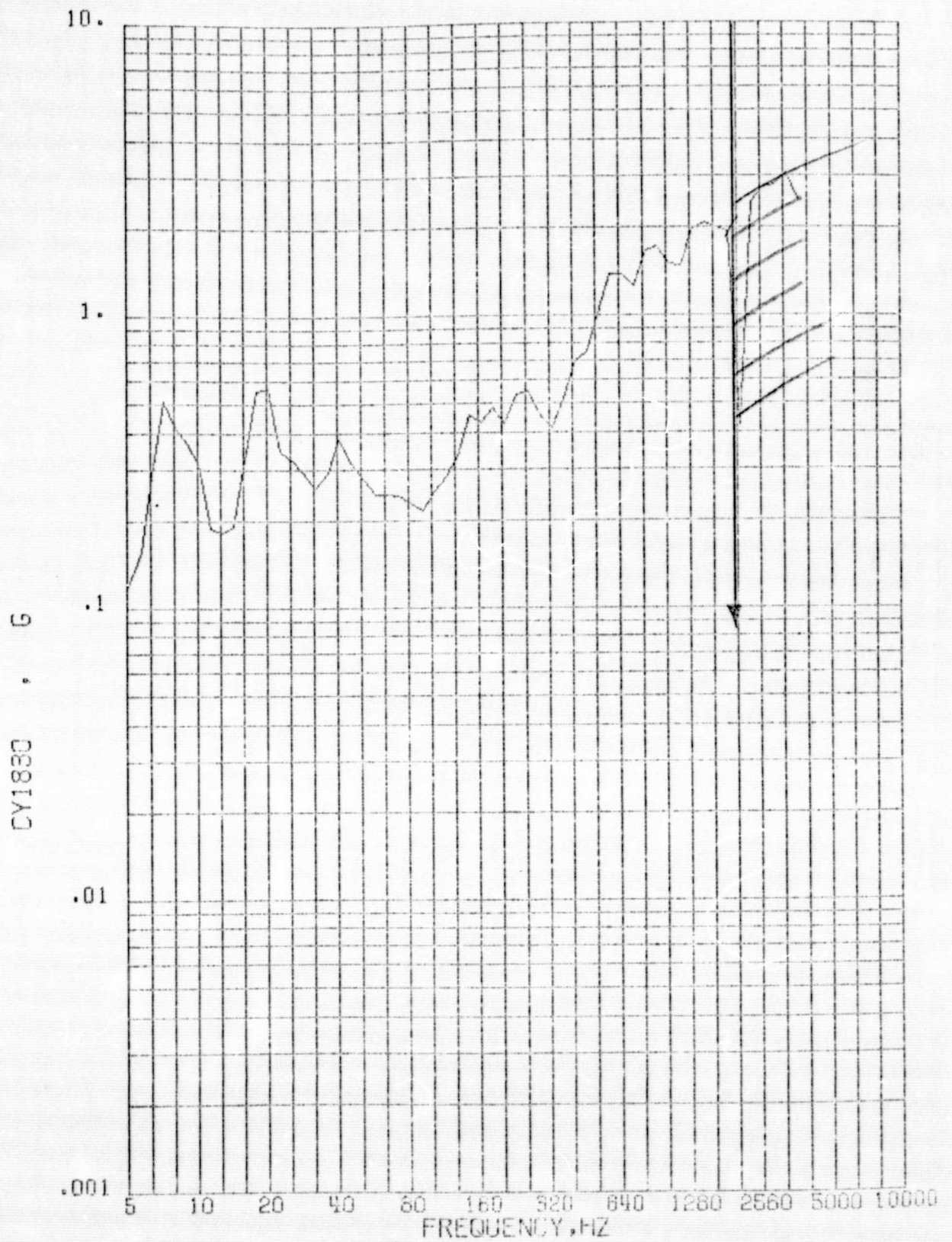


Figure 4.19a

SHOCK SPECTRUM



START=67251.5000SEC.

STOP=67255.0000SEC.

0=10.

VIKING B

ST G 1 IGN

4096 SPS

CY1830

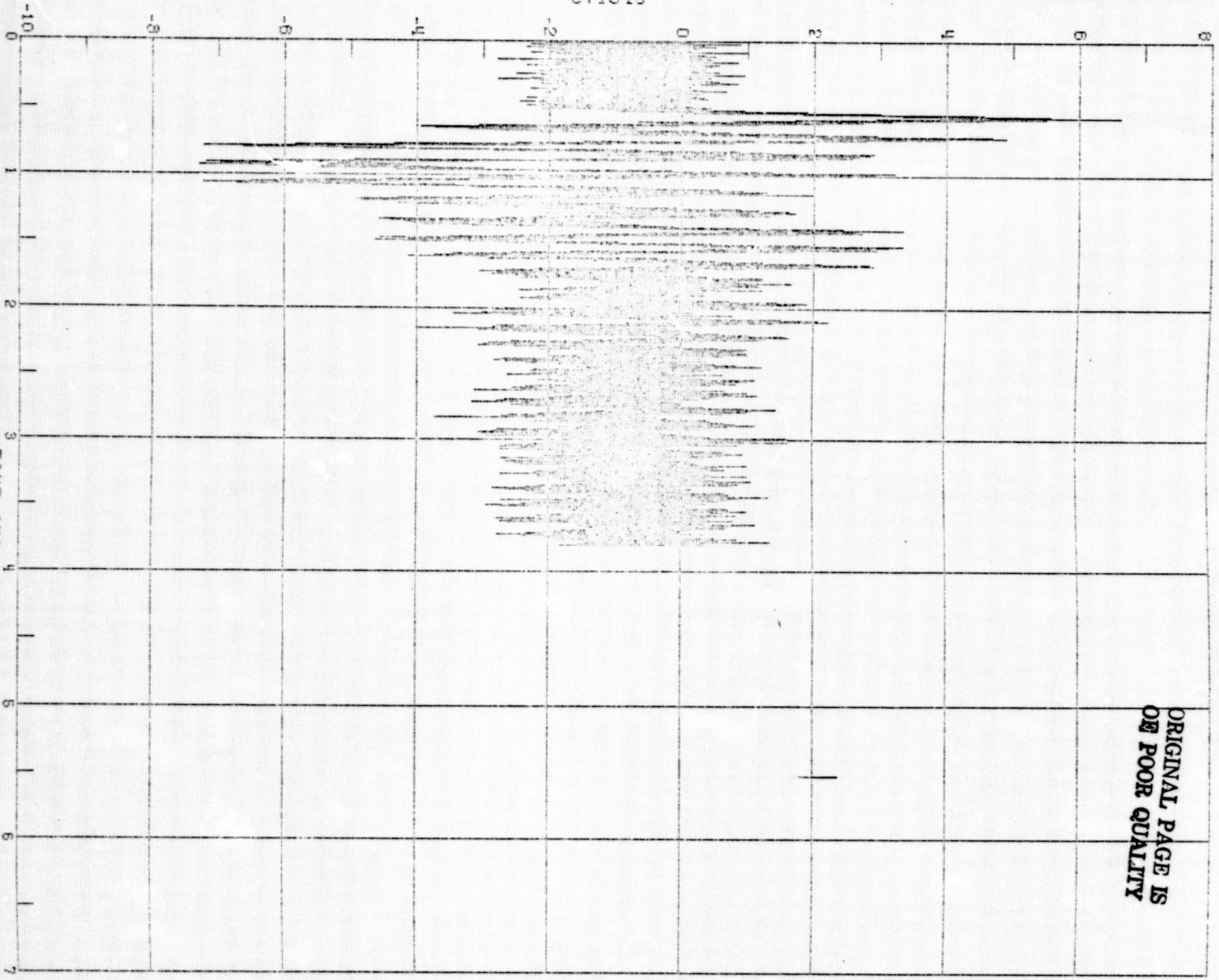
4.41^b

Figure 4.19b

X 10⁻¹

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CY1840



START=67251.2000SEC.

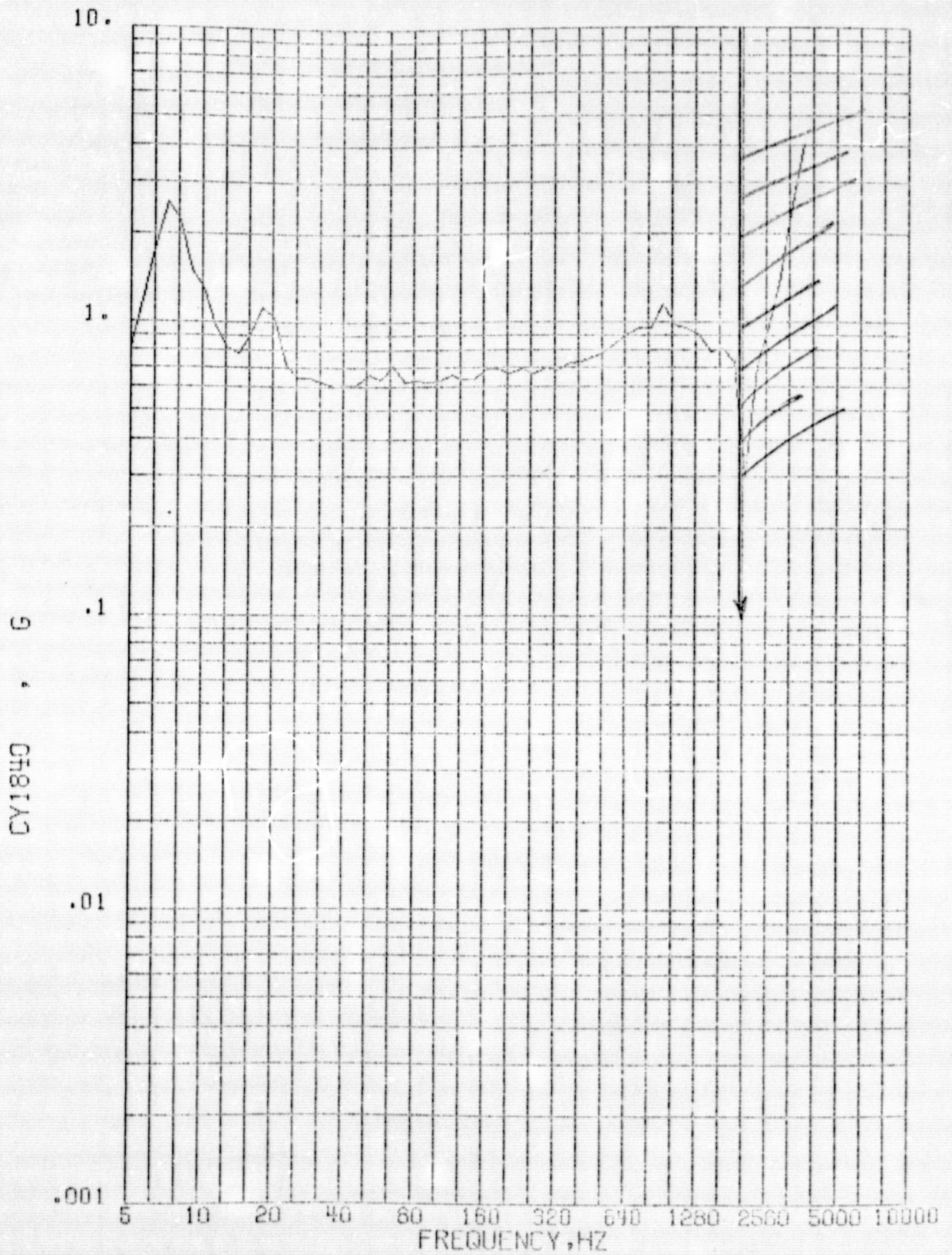
STOP=67255.0000SEC.

4096 SPS

44.42

Figure 4.20a

SHOCK SPECTRUM



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STOP=67255.0000SEC.

Q=10.

VIKING B

ST G 1 IGN

4096 SPS

CY1840

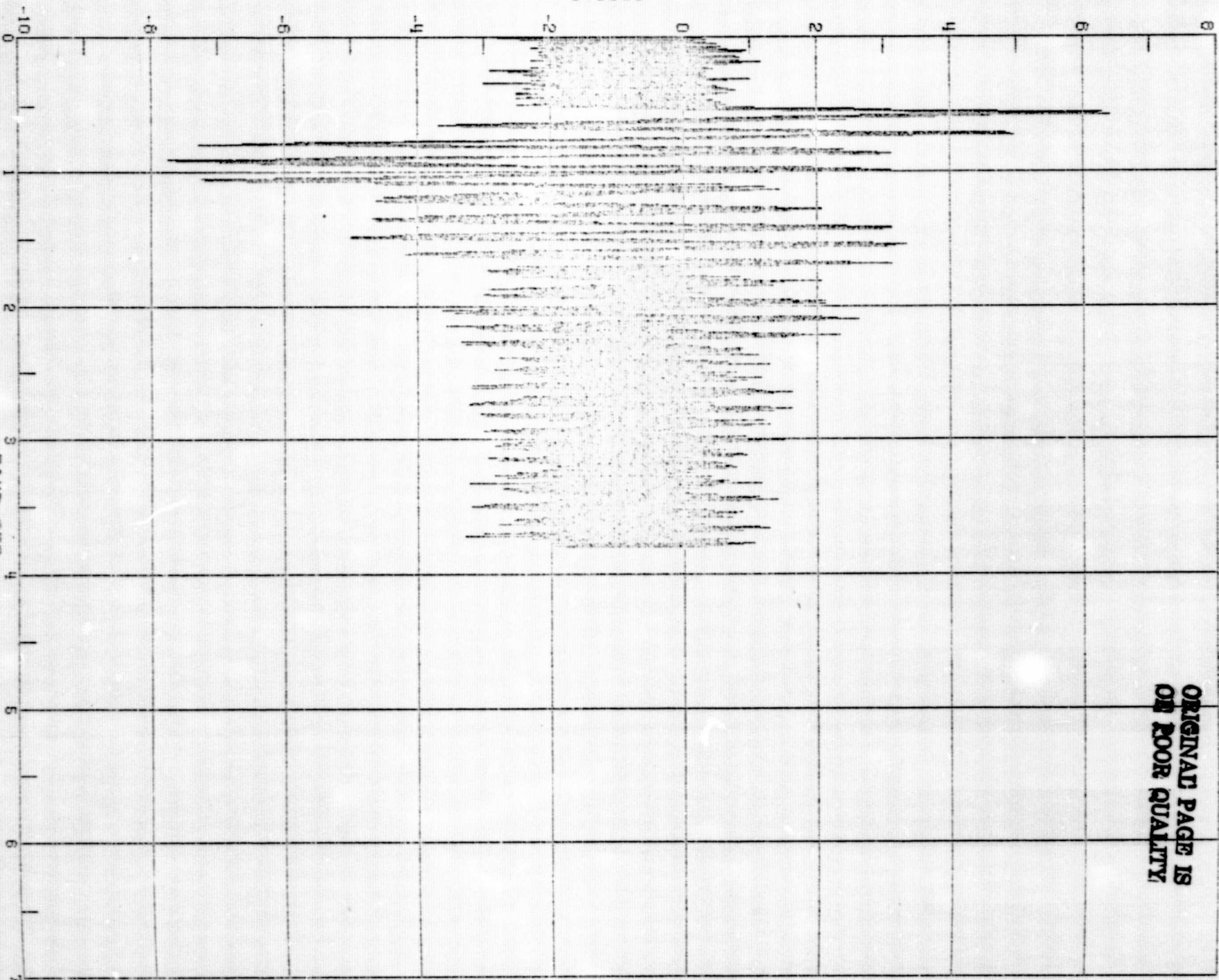
4.436

Figure 4. 20b

CY1850

x 10⁻¹

ORIGINAL PAGE IS
OF POOR QUALITY



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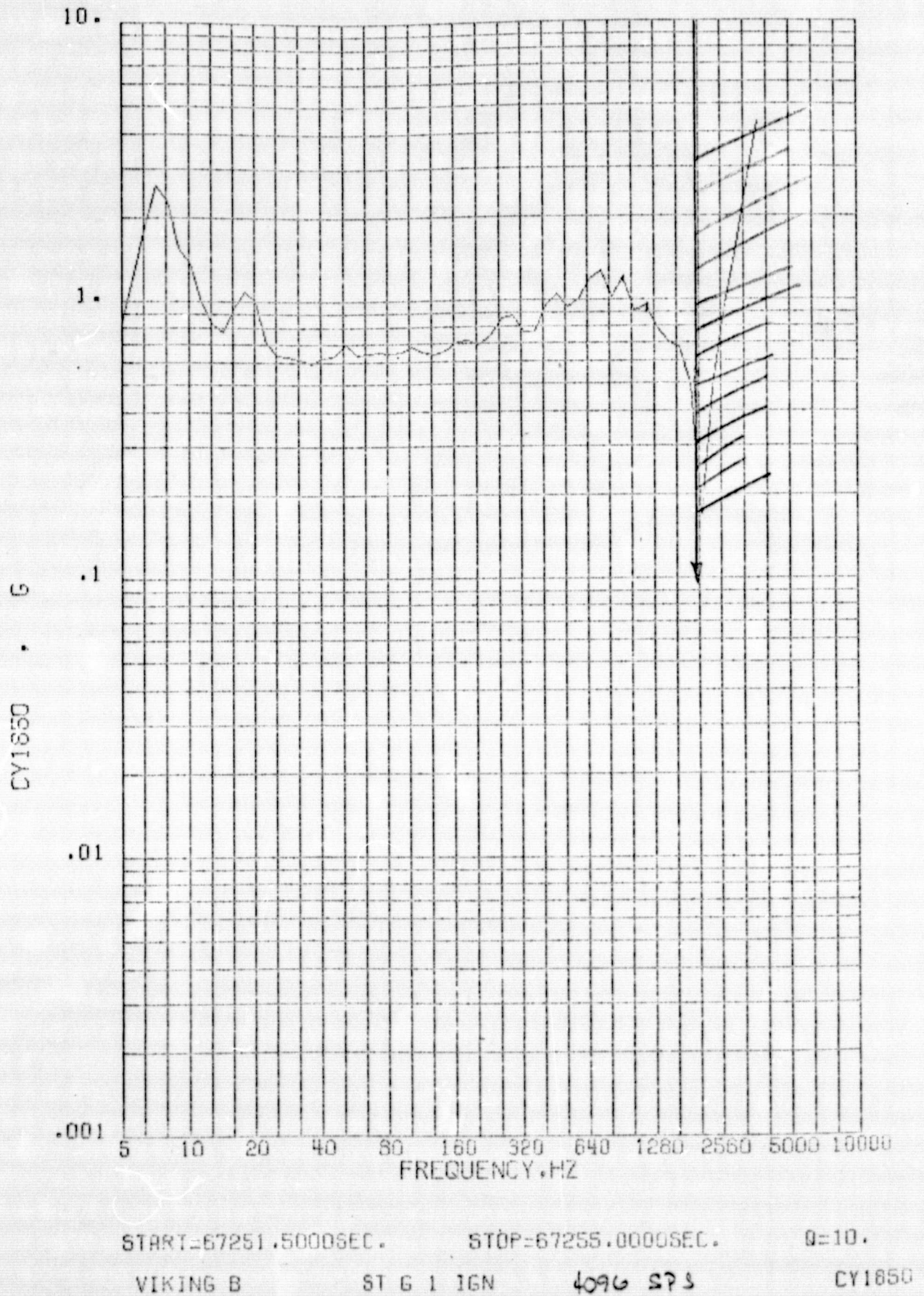
TIME, SEC.
STOP=67255.0000SEC.

4096 SPS

4.4419

Figure 4. 21a

SHOCK SPECTRUM



4.451 b

Figure 4. 21b

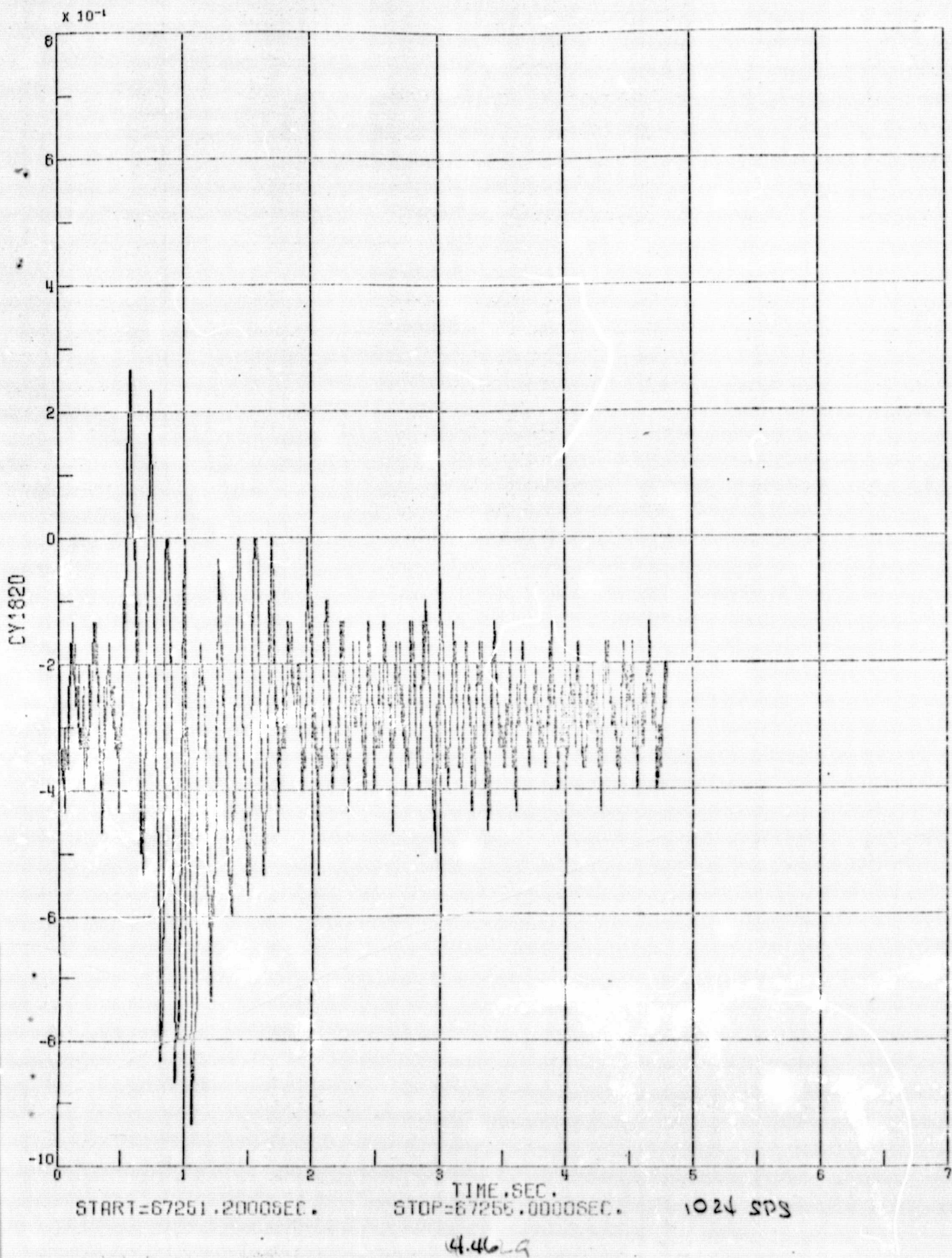
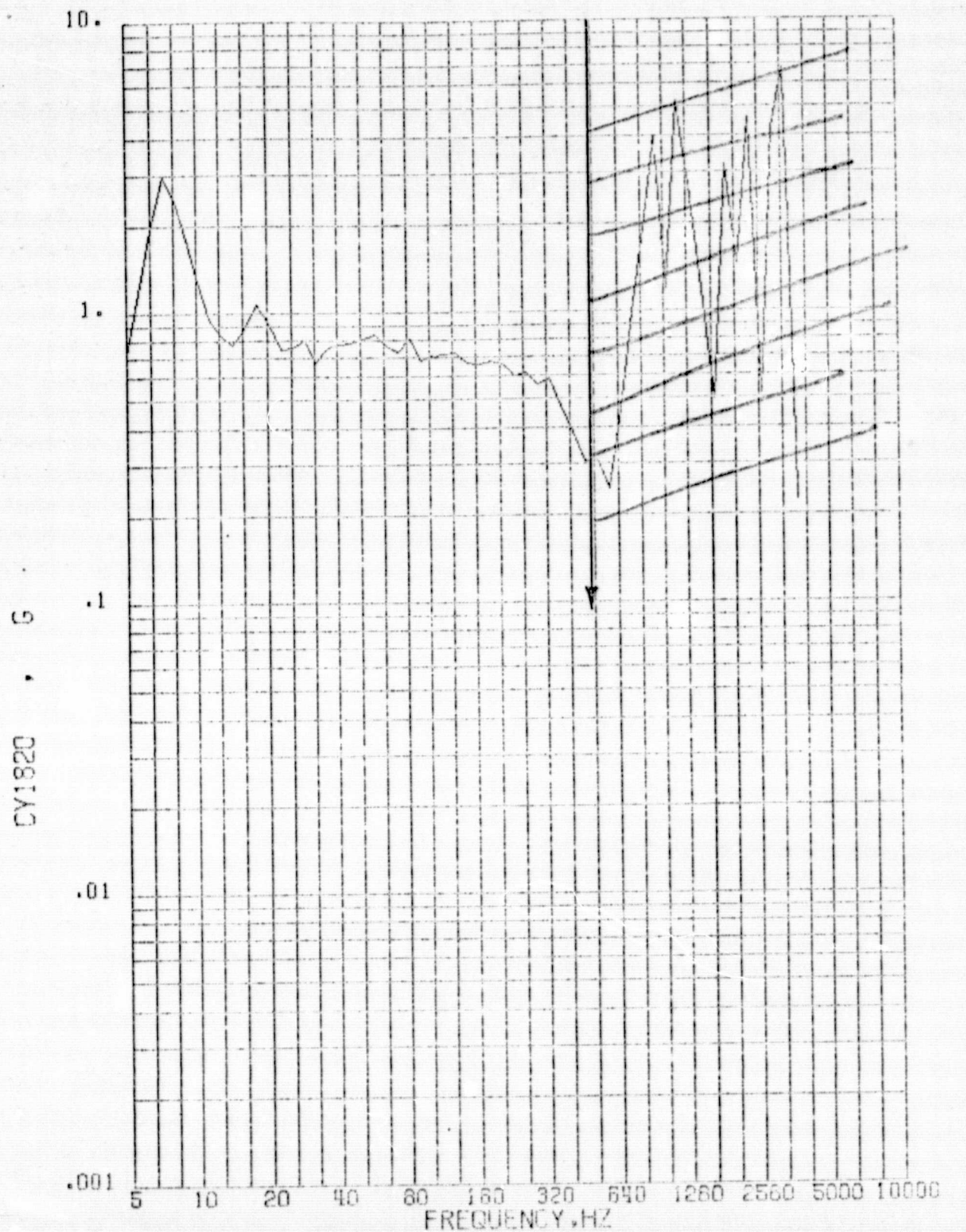


Figure 4. 22a

SHOCK SPECTRUM



START=67251.5000SEC.

STOP=67256.0000SEC.

Q=10.

VIKING B

ST AGE 1 IGNITION

9/ CY1820

1024 SPS

14.42 b

Figure 4.22b

$\times 10^{-2}$

CY1830

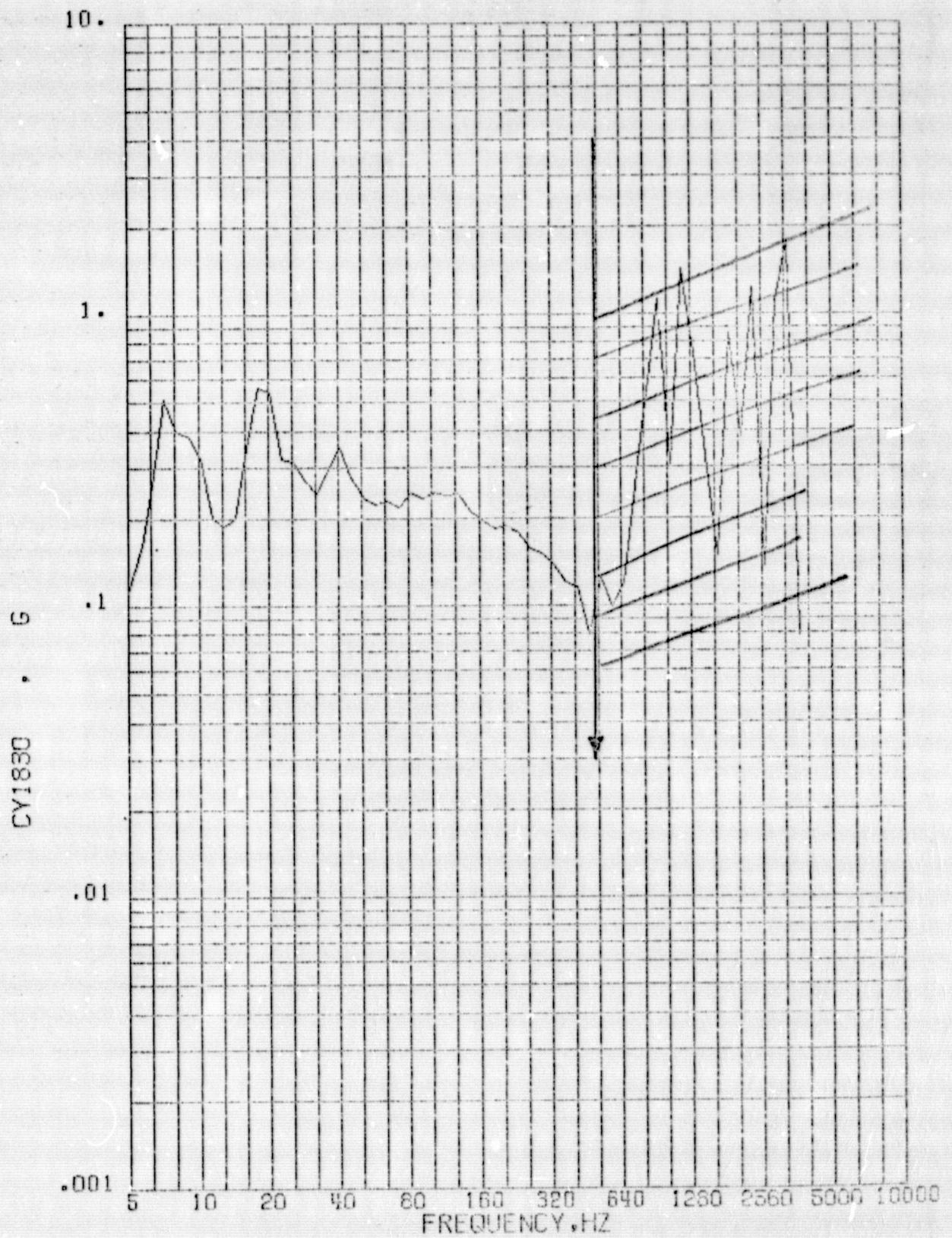
START=67251.2000SEC. STOP=67256.0000SEC. 1024 SPS

TIME, SEC.

448

Figure 4.23a

SHOCK SPECTRUM



START=67251.5000SEC.

STOP=67256.0000SEC.

Q=10.

VIKING B

ST AGE 1

IGNITION

9/ CY1830

1024 SPS

4.496

Figure 4. 23b

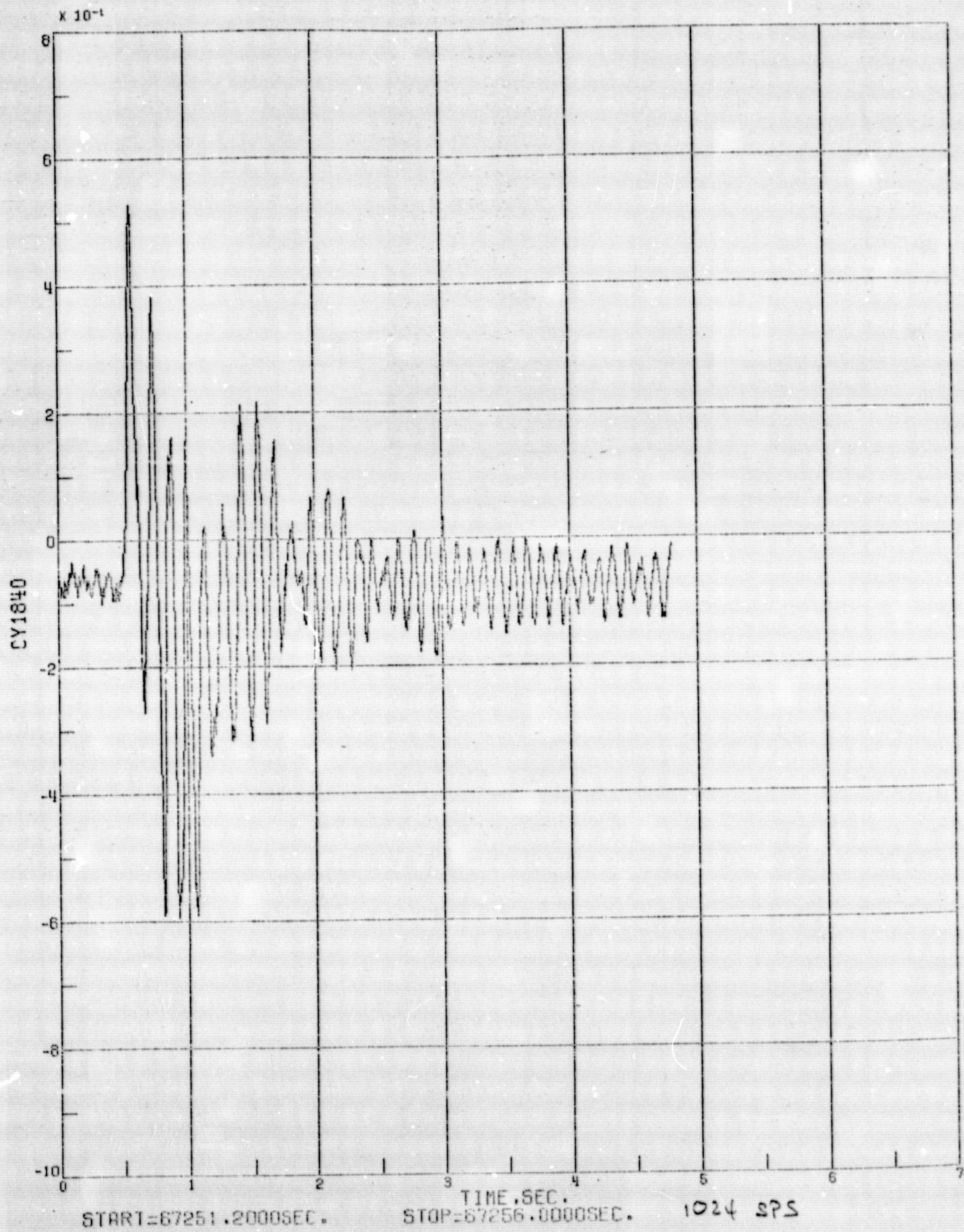
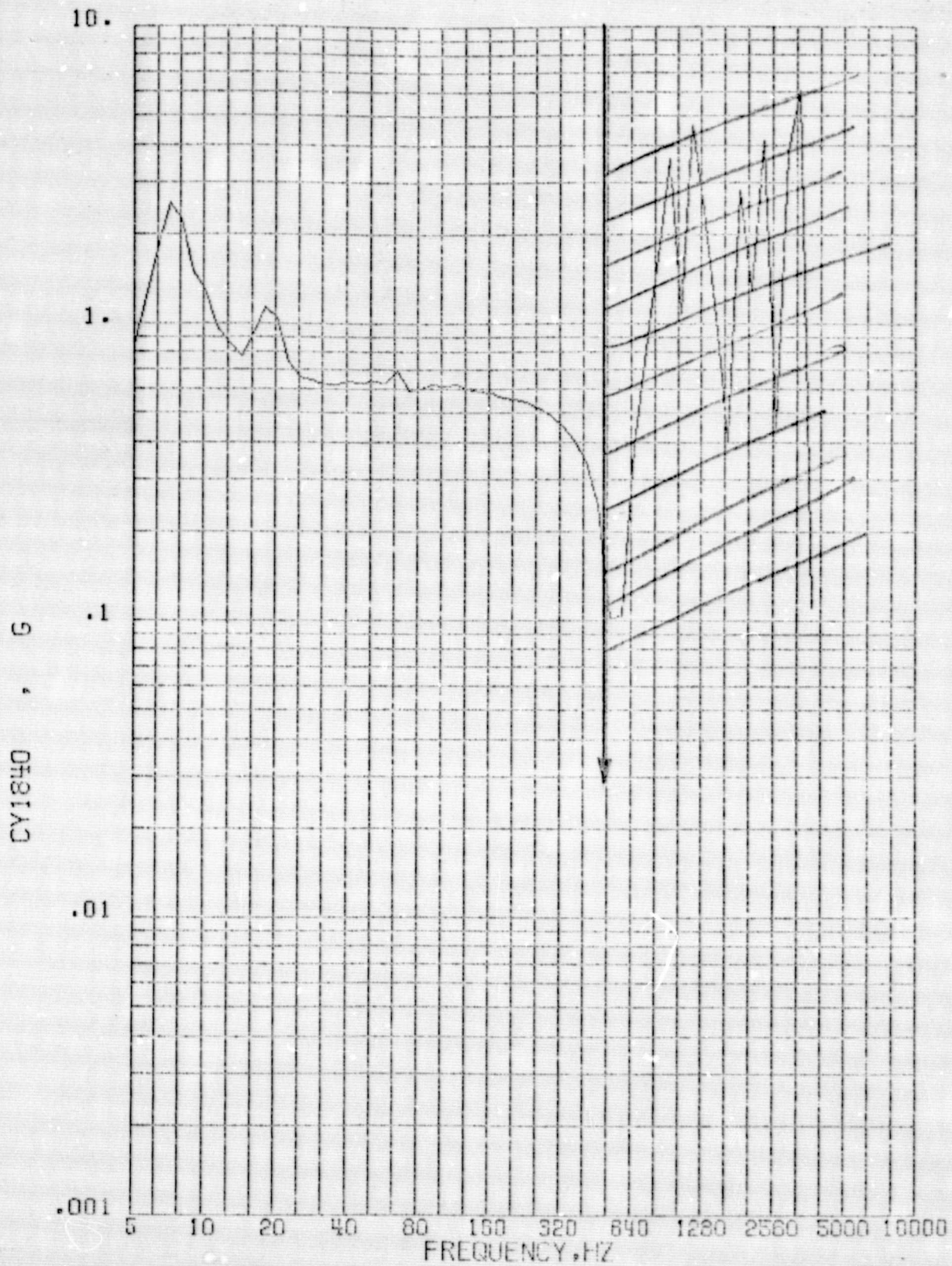


Figure 4.24a

SHOCK SPECTRUM



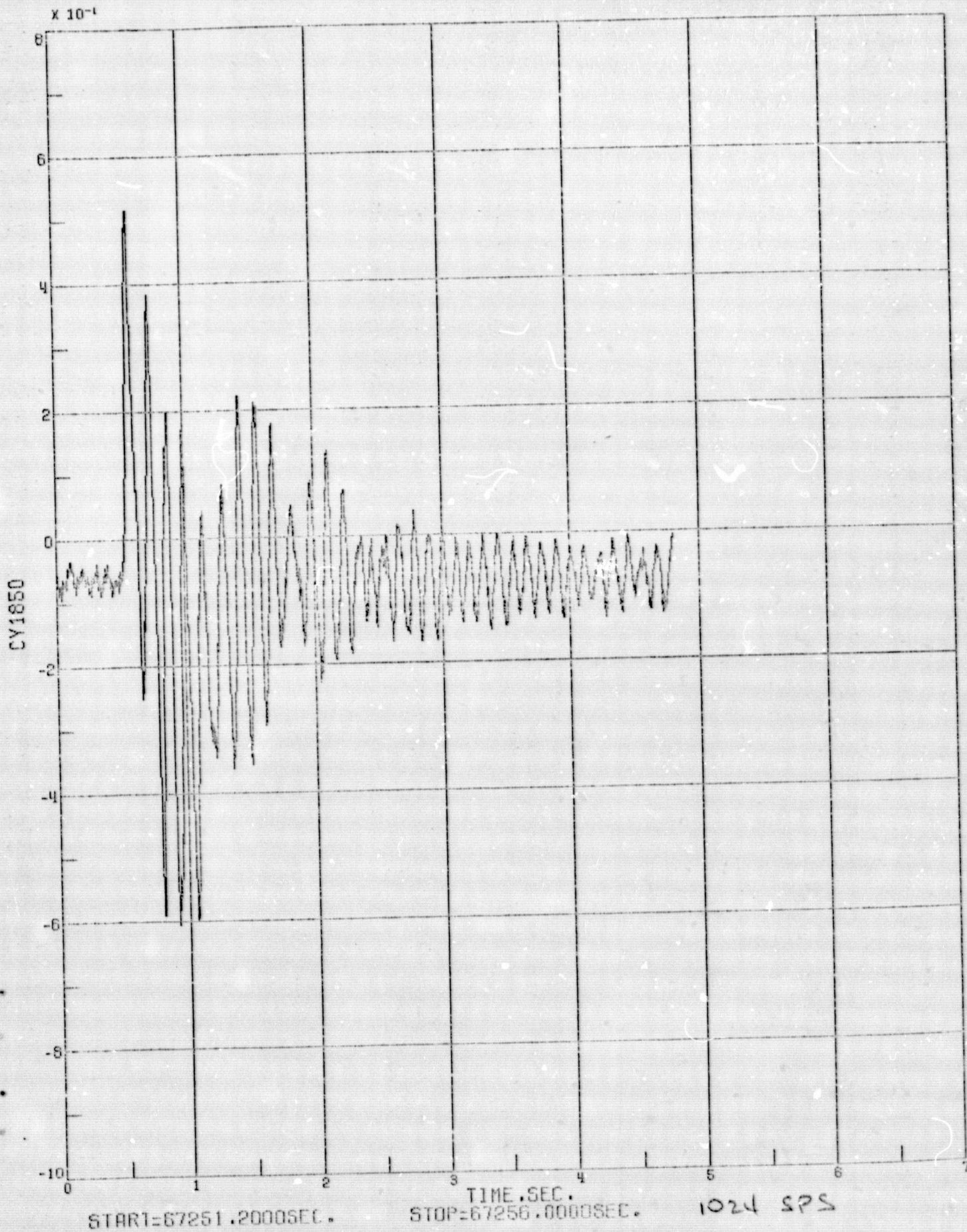
START=67251.5000SEC. STOP=67256.0000SEC. Q=10.

VIKING B ST AGE 1 IGNITION 9/ CY1840

1024 SPS

4.51
d. 64 b

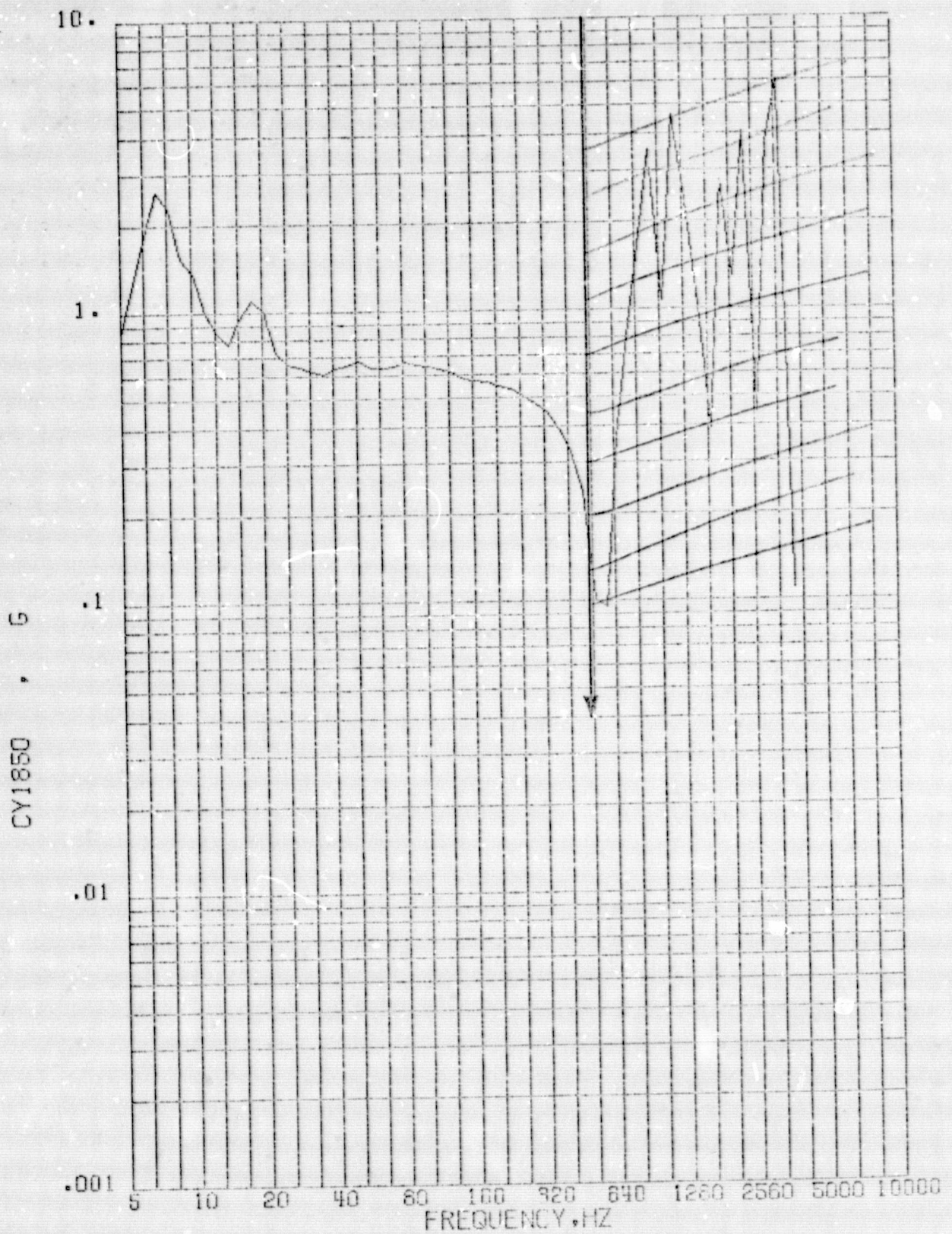
Figure 4. 24b



4.52
d. 259

Figure 4.25a

SHOCK SPECTRUM



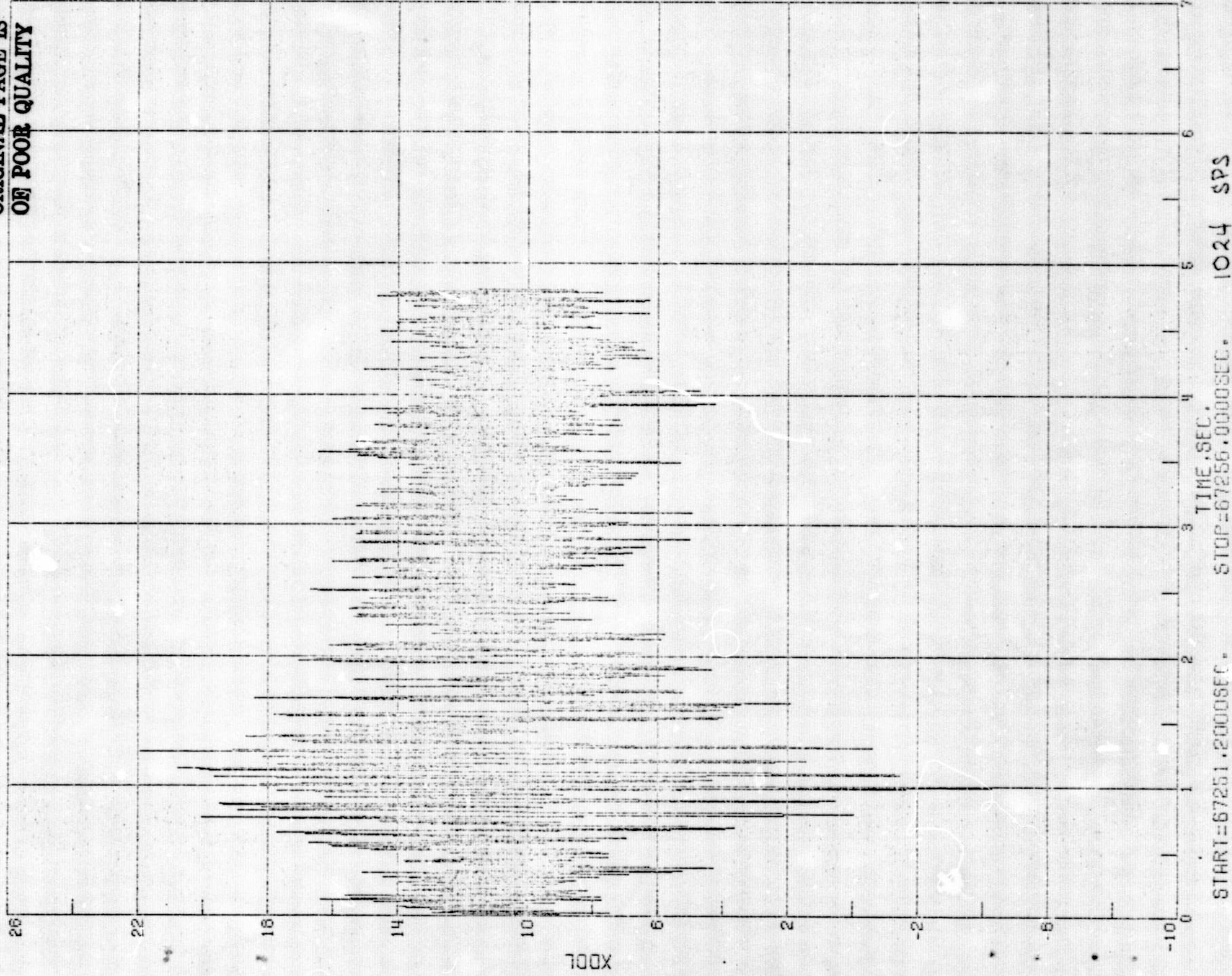
START=67251.5000SEC. STOP=67256.0000SEC. Q=10.
 VIKING B ST AGE 1 IGNITION 9/ CY1850
 1024 SPS

4.53

Figure 4.25b

$\times 10^{-2}$

ORIGINAL PAGE IS
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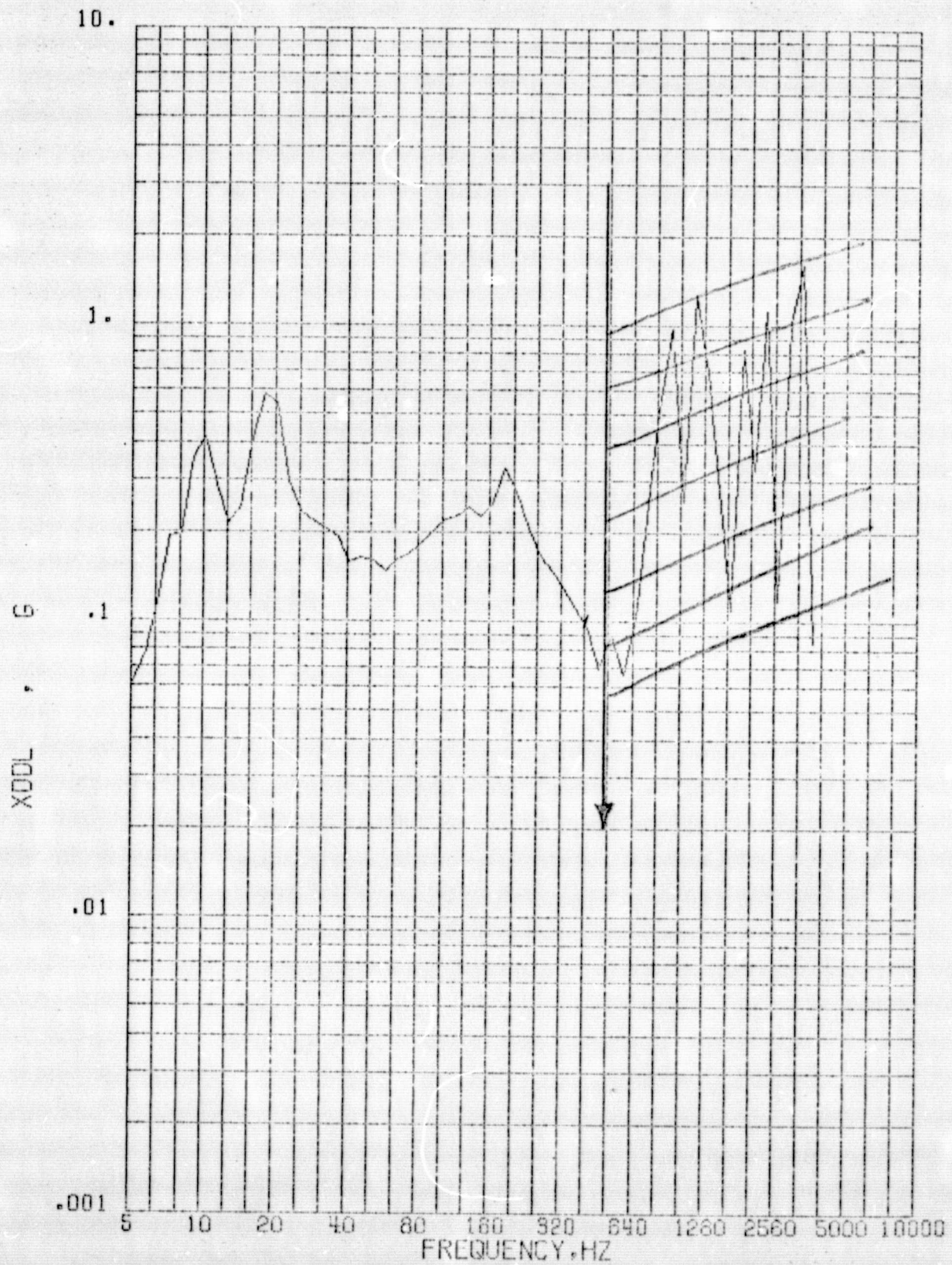


700X

4.54
4.20 9

Figure 4. 26a

SHOCK SPECTRUM



START=67251.5000SEC.

STOP=67256.0000SEC.

$\theta=10.$

VIKING B

ST AGE 1 IGNITION

9/ XDDL

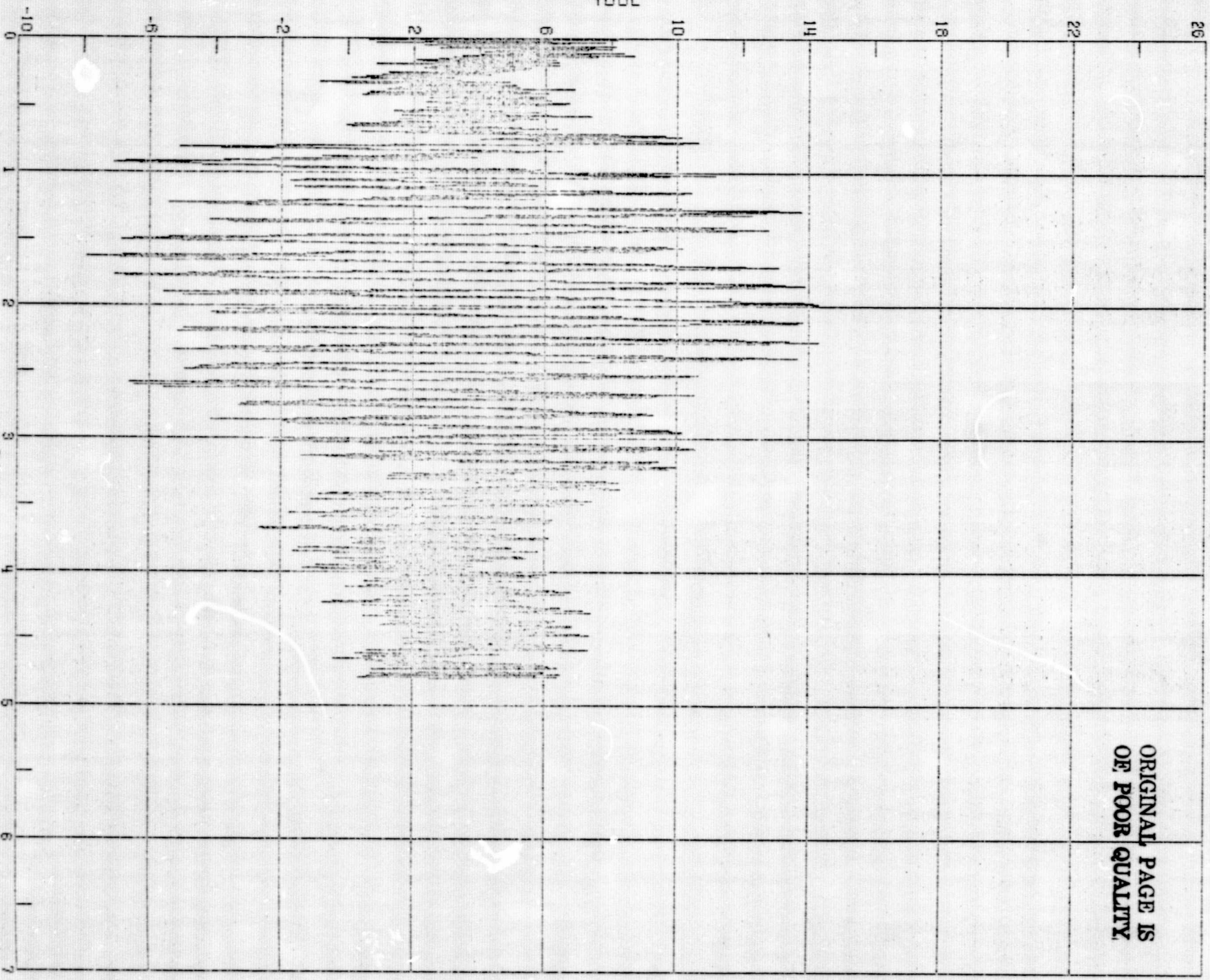
1024 SPS

4.20 4.55

Figure 4. 26b

X 10⁻²

ORIGINAL PAGE IS
OF POOR QUALITY



START=67251.2000SEC.

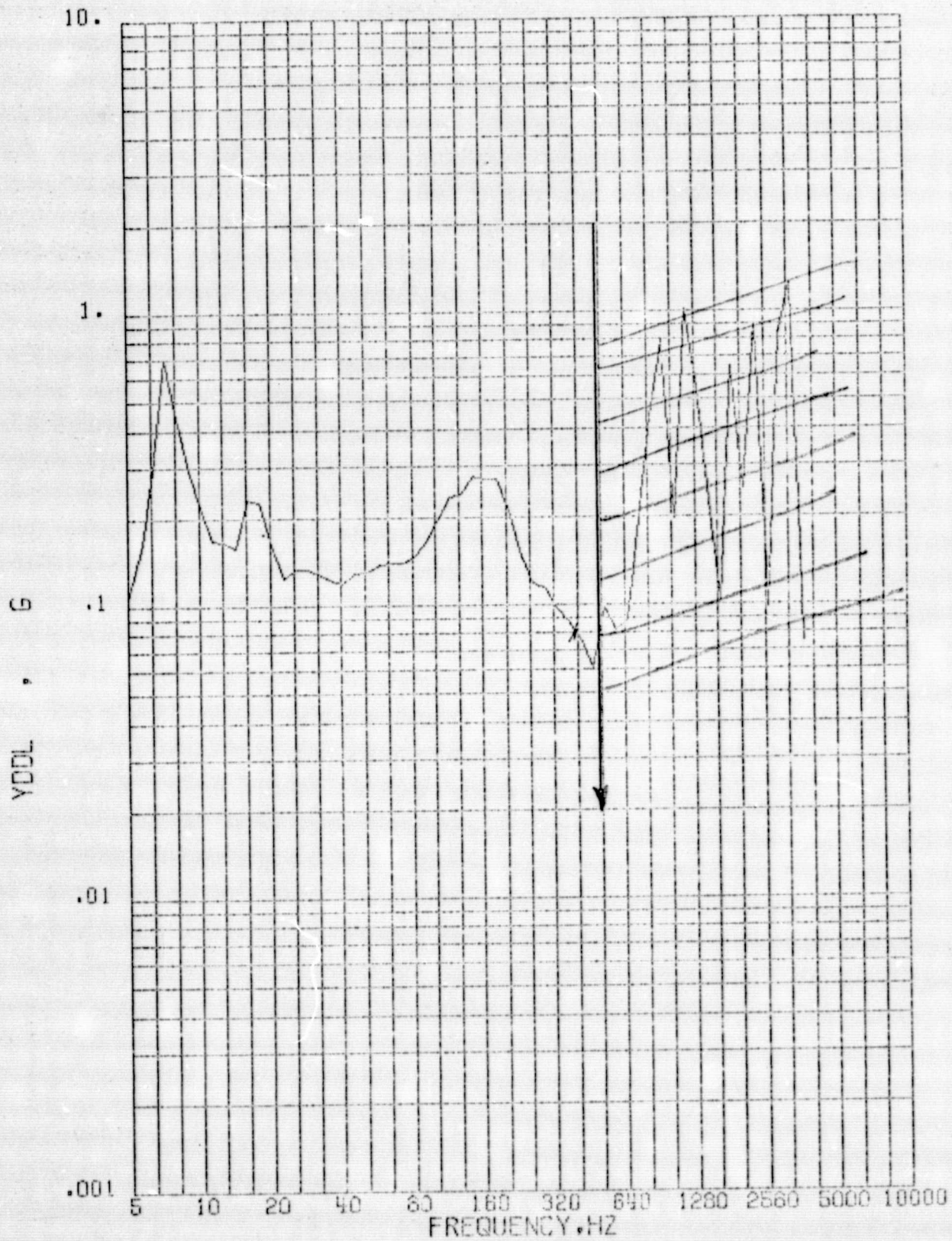
STOP=67256.0000SEC.

1024 SPS

4.56

Figure 4.27a

SHOCK SPECTRUM



START=67251.5000SEC.

STOP=67256.0000SEC.

Q=10.

VIKING B

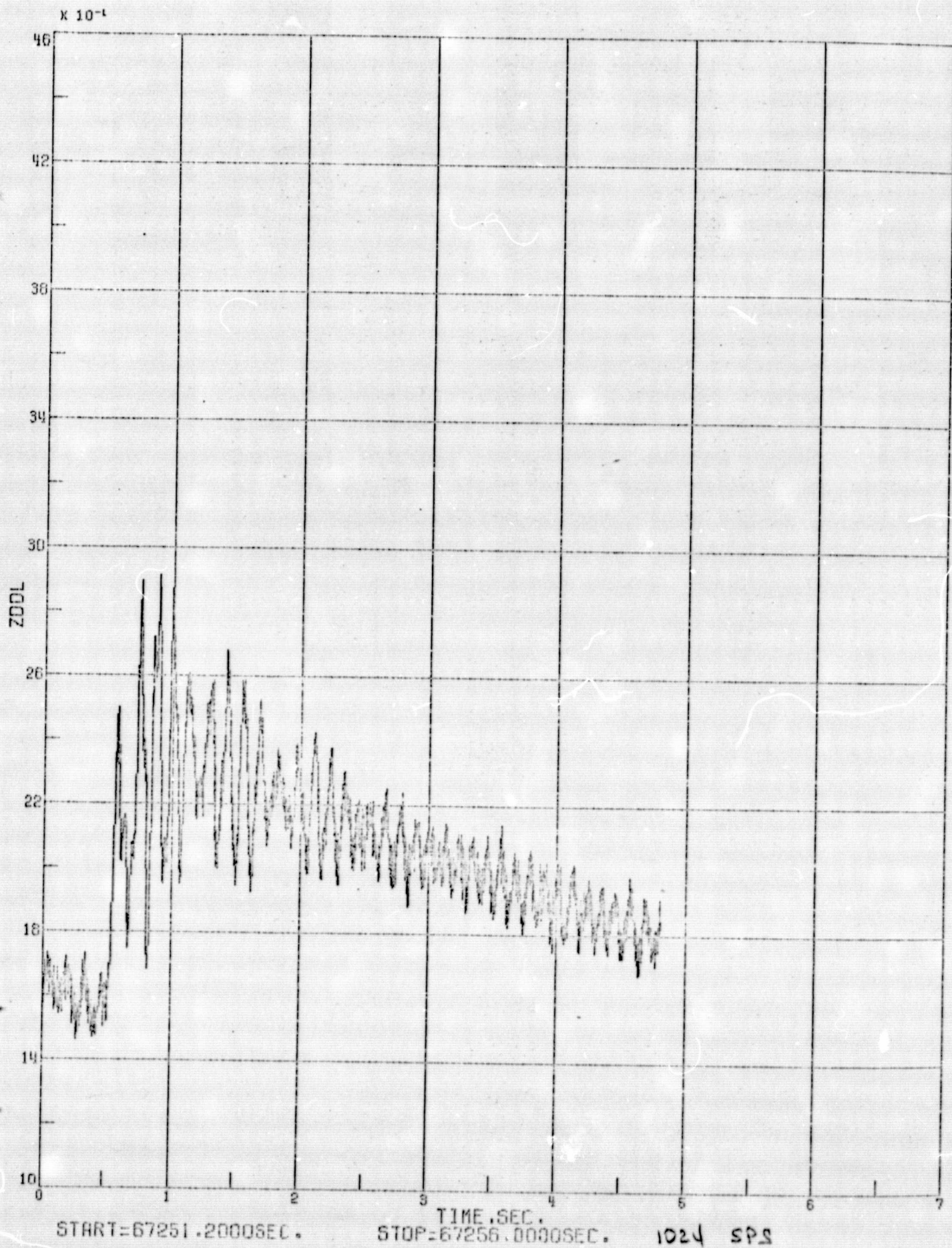
ST AGE 1 IGNITION

9/ YDDL

1024 SPS

4.457b

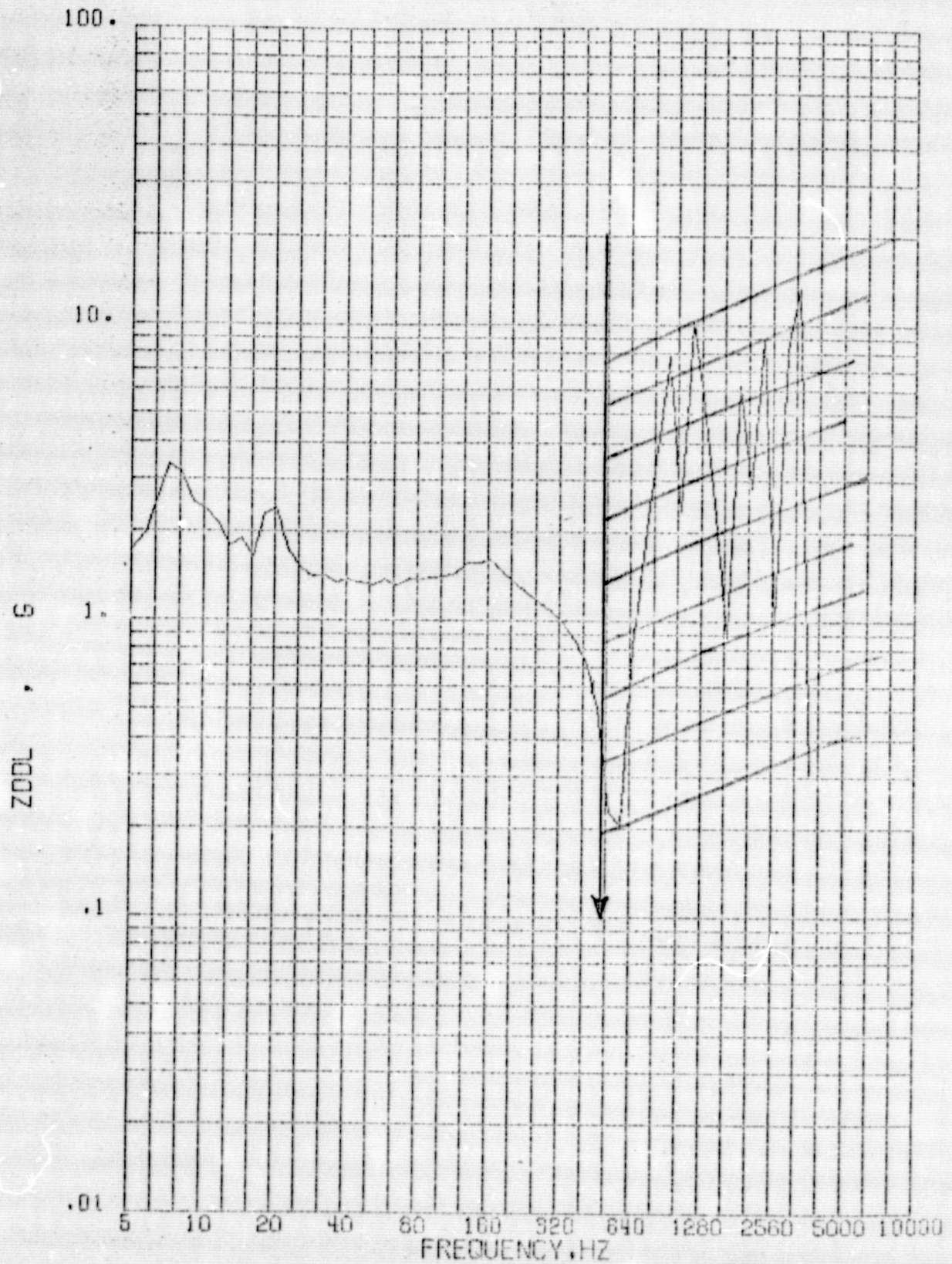
Figure 4. 27b



(4.58)

Figure 4. 28a

SHOCK SPECTRUM



START=67251.5000SEC.

STOP=67256.0000SEC.

Q=10.

VIKING B

ST AGE 1

IGNITION

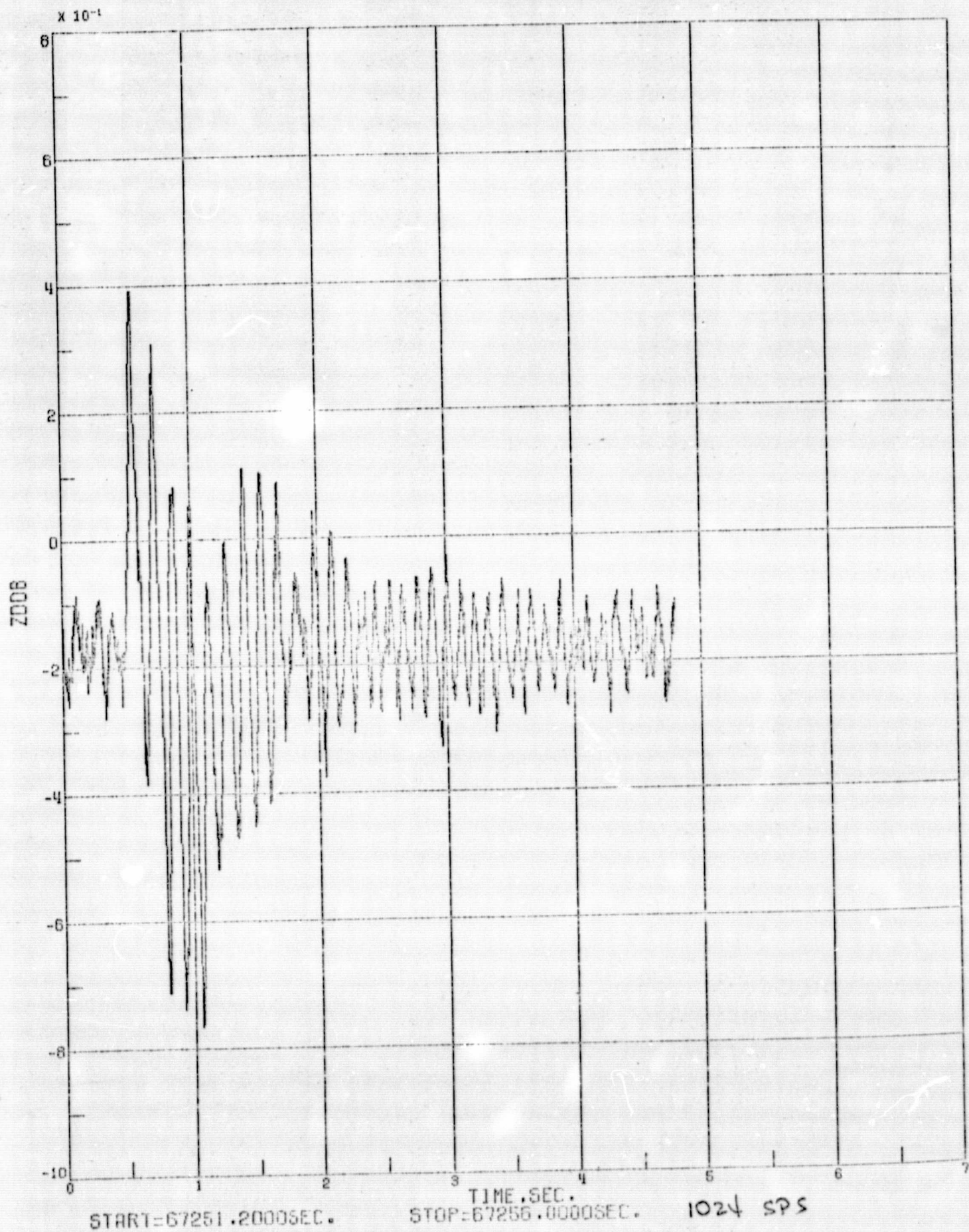
9/

ZDDL

1224 SPS

4.59
4.20 b

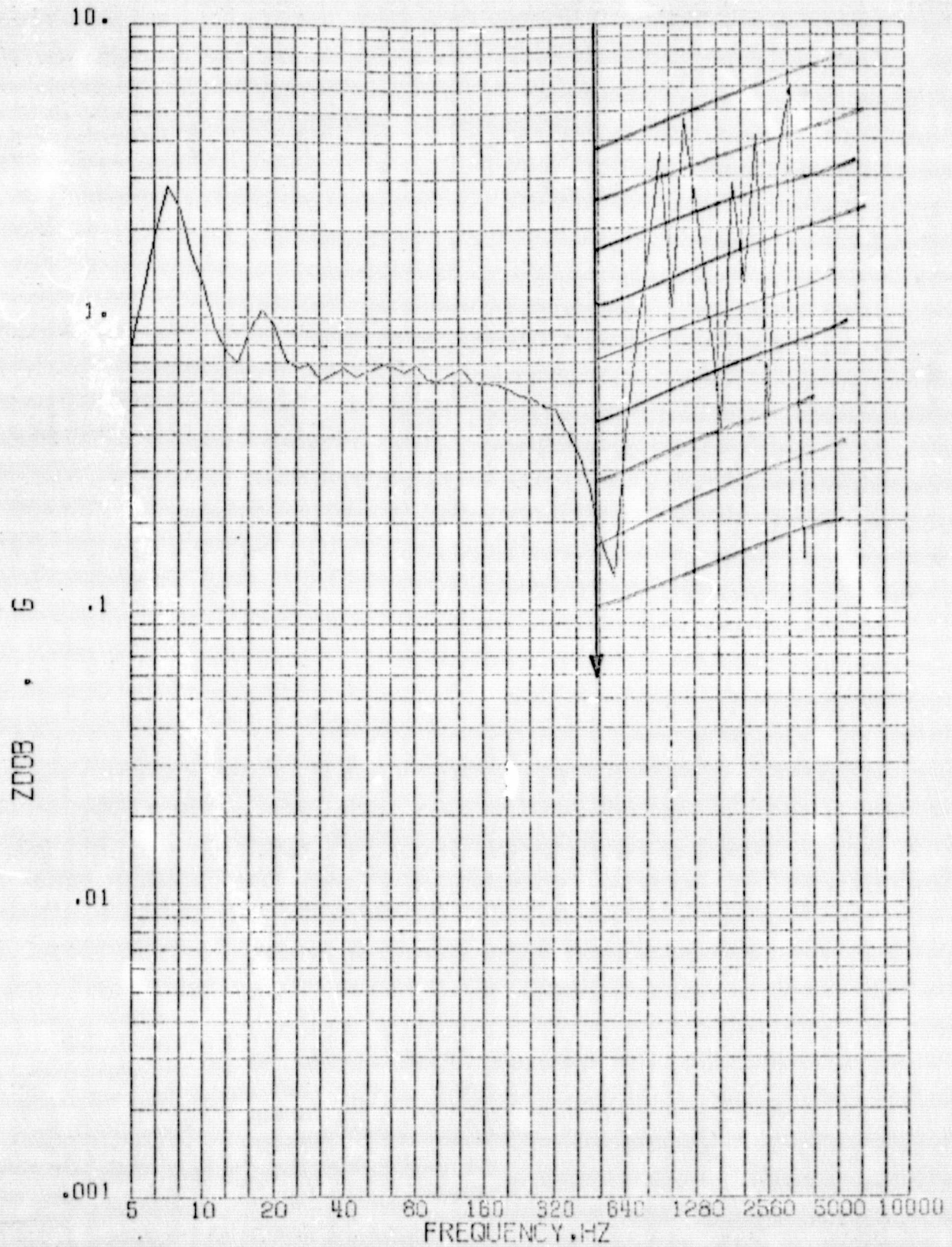
Figure 4. 28b



4.60

Figure 4.29a

SHOCK SPECTRUM



START=67251.5000SEC.

STOP=67256.0000SEC.

θ=10.

VIKING B

ST AGE 1

IGNITION

9/

ZODB

1024 SPS

4.61 b

Figure 4.29b

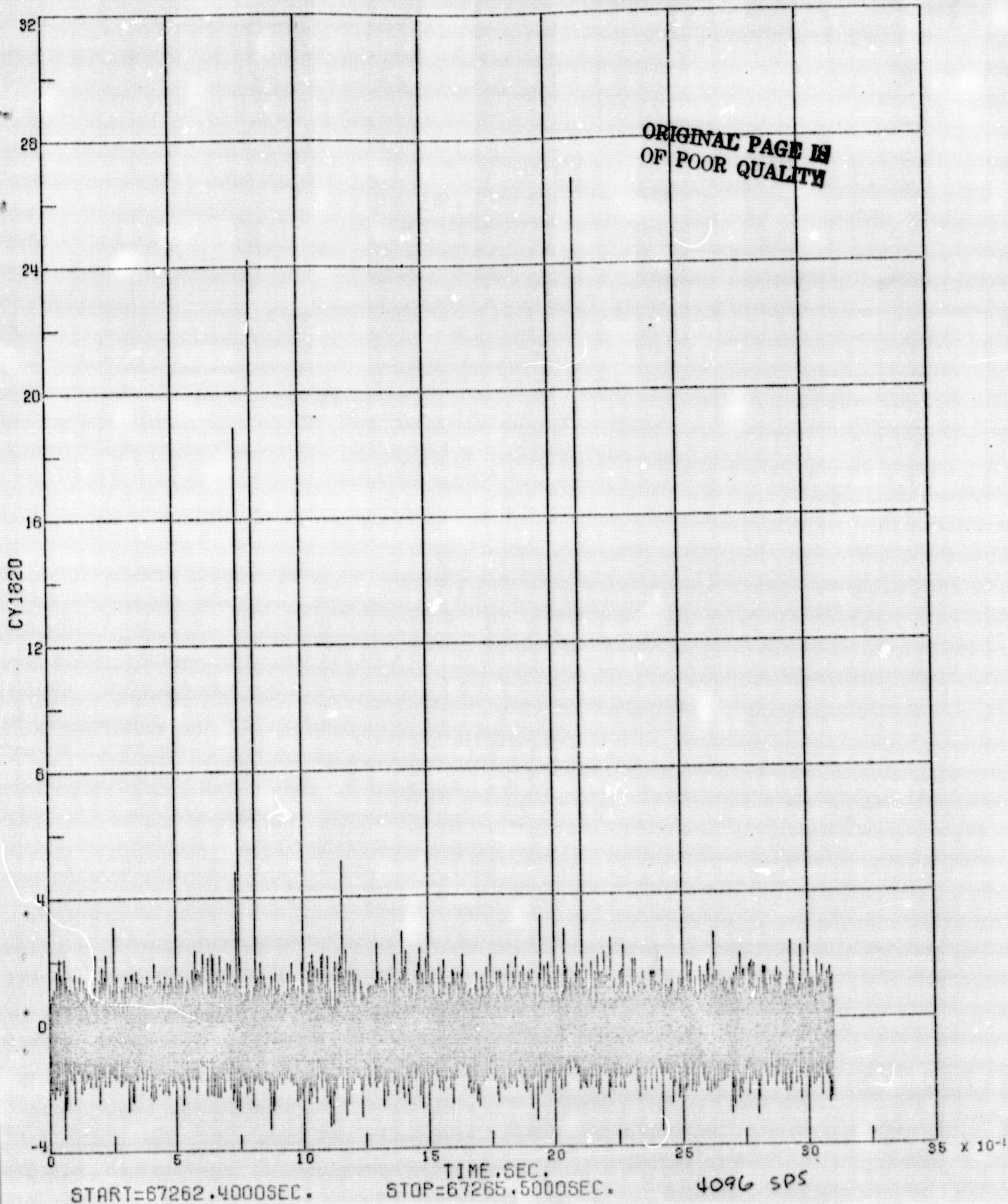
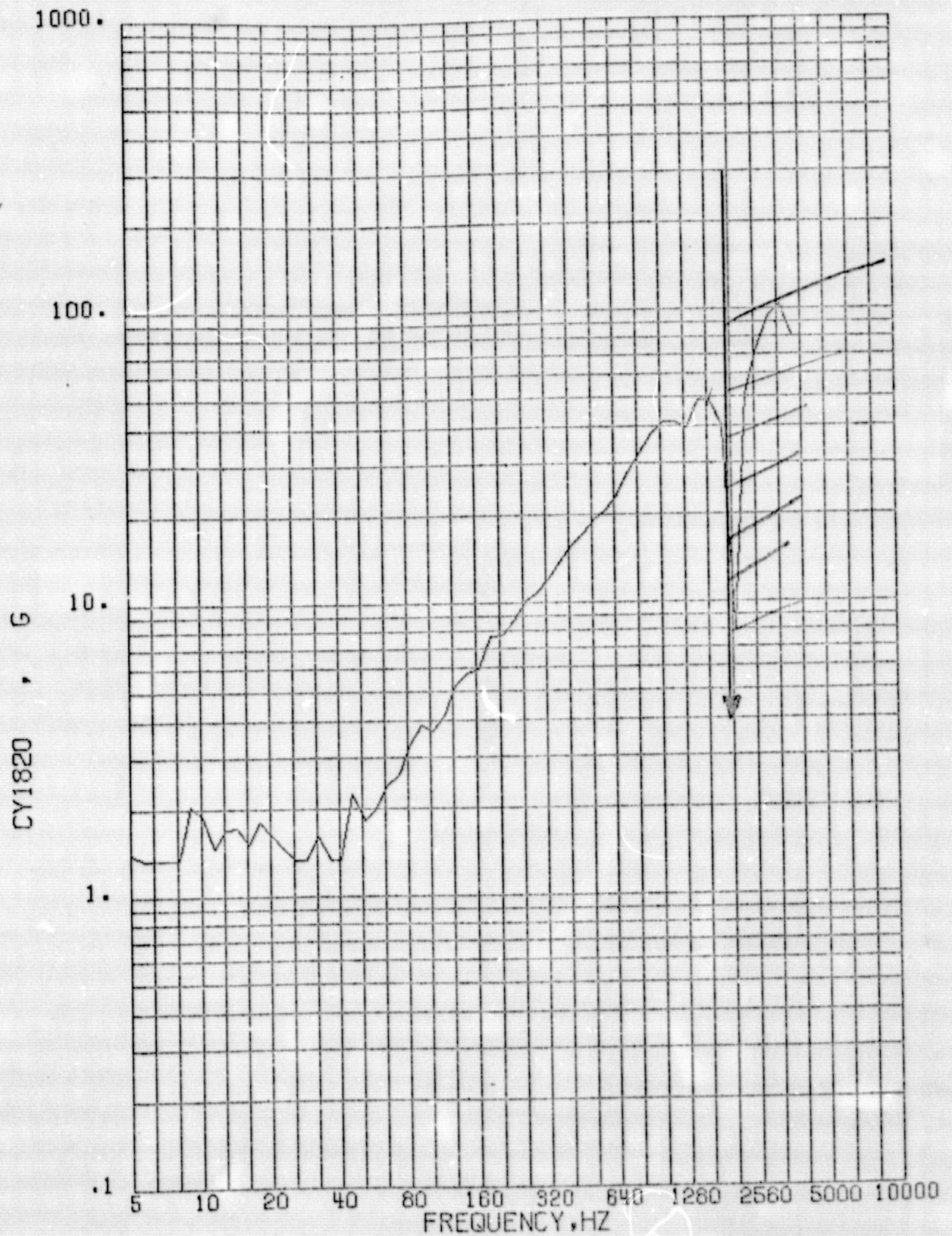


Figure 4.30a

SHOCK SPECTRUM



START=67262.9000SEC.

STOP=67265.5000SEC.

Q=10.

VIKING B

JE TT SRM

(G3J)

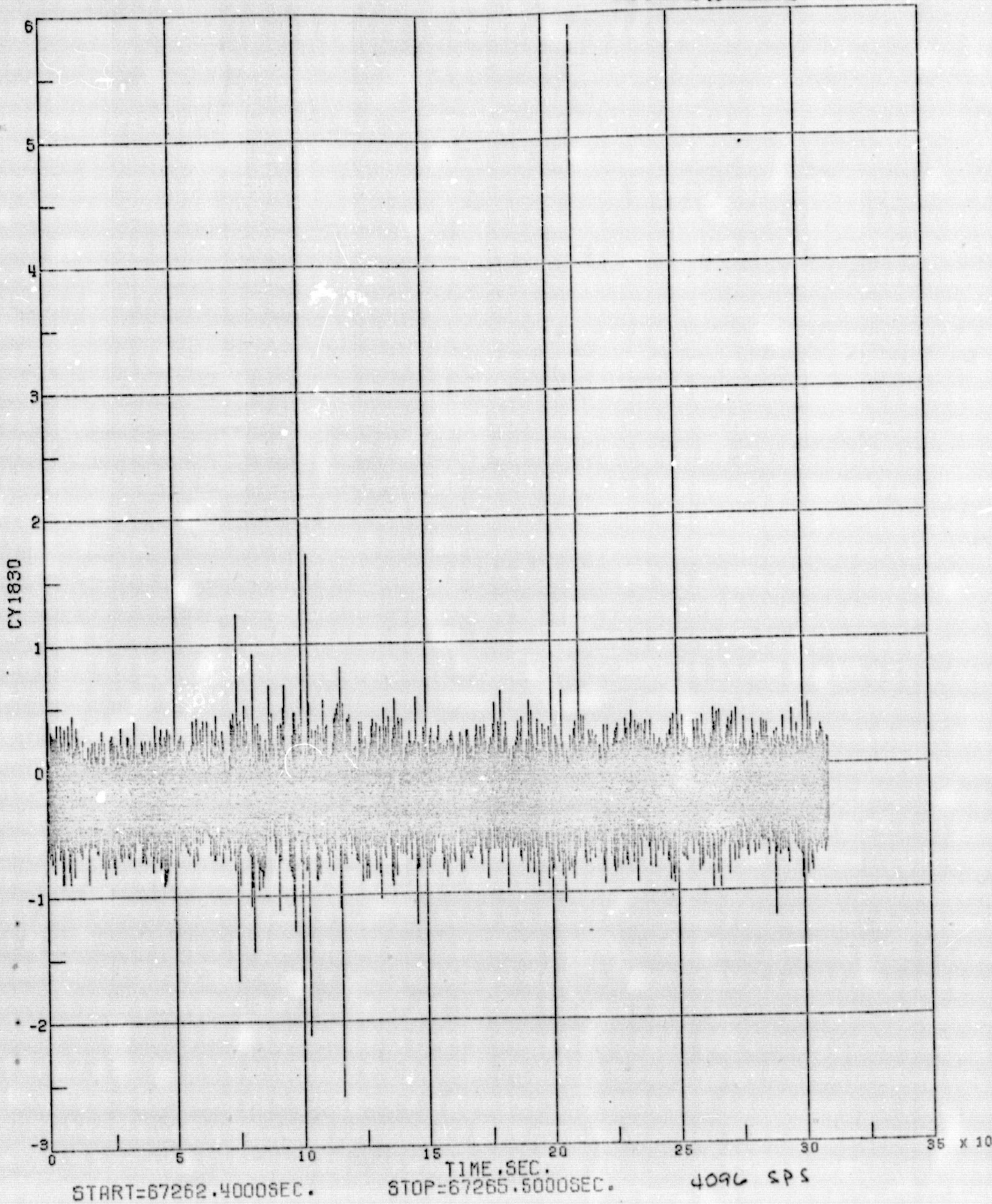
9/ CY1820

4096 EPS

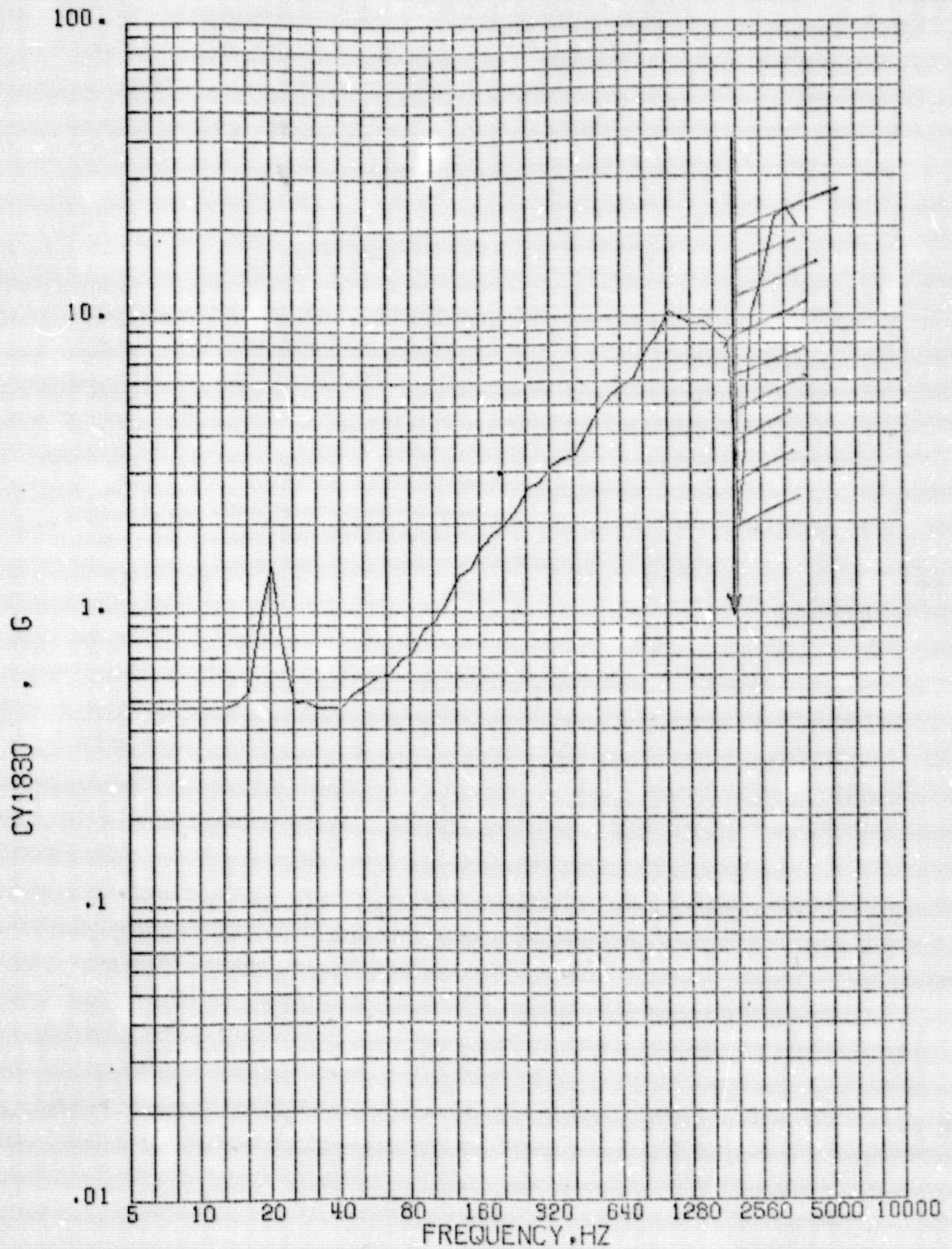
4.30 b 4.63

Figure 4.30b

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SHOCK SPECTRUM



START=67262.9000SEC.

STOP=67265.5000SEC.

Q=10.

VIKING B

JE TT SRM

(GB1)

9/ CY1830

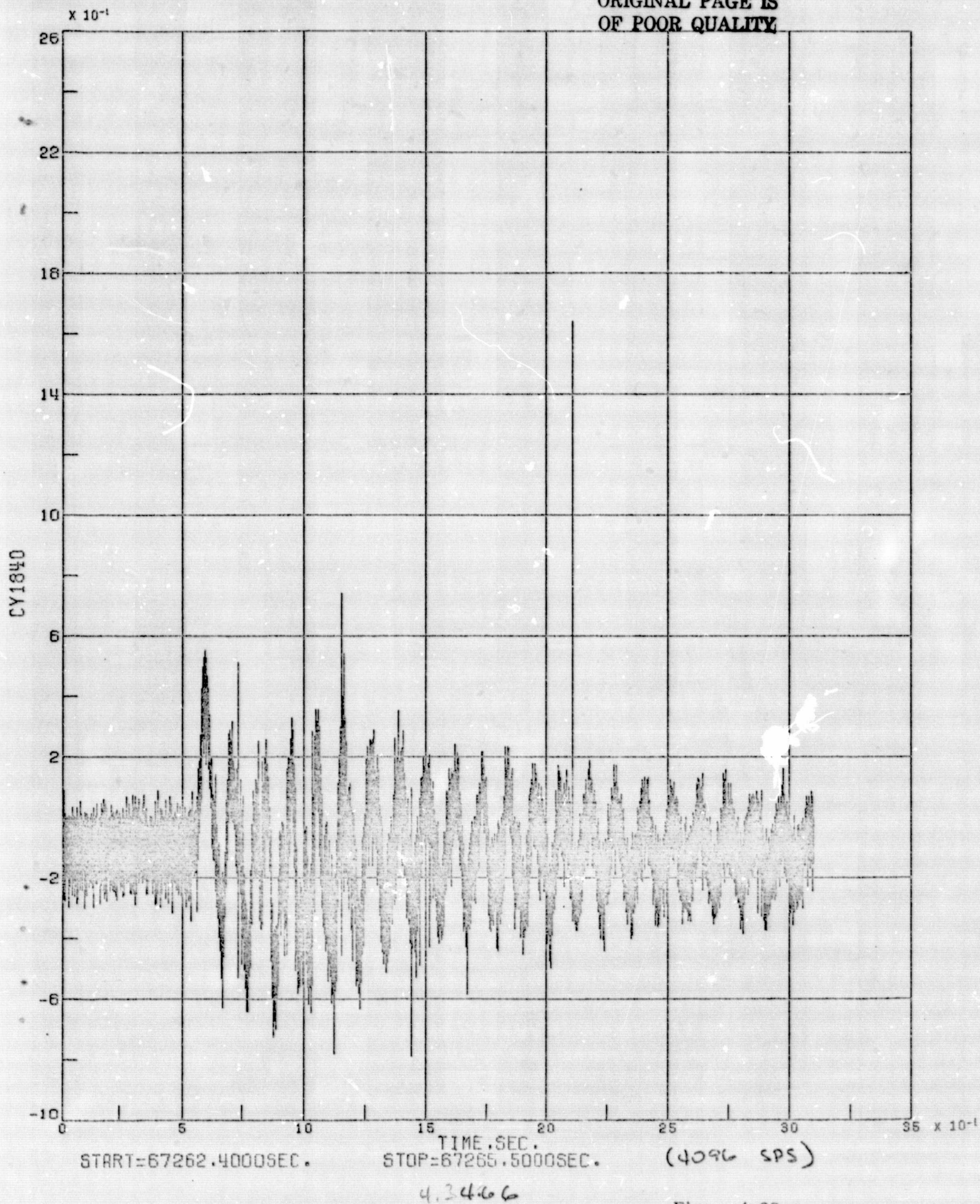
4096 SPS

4.05

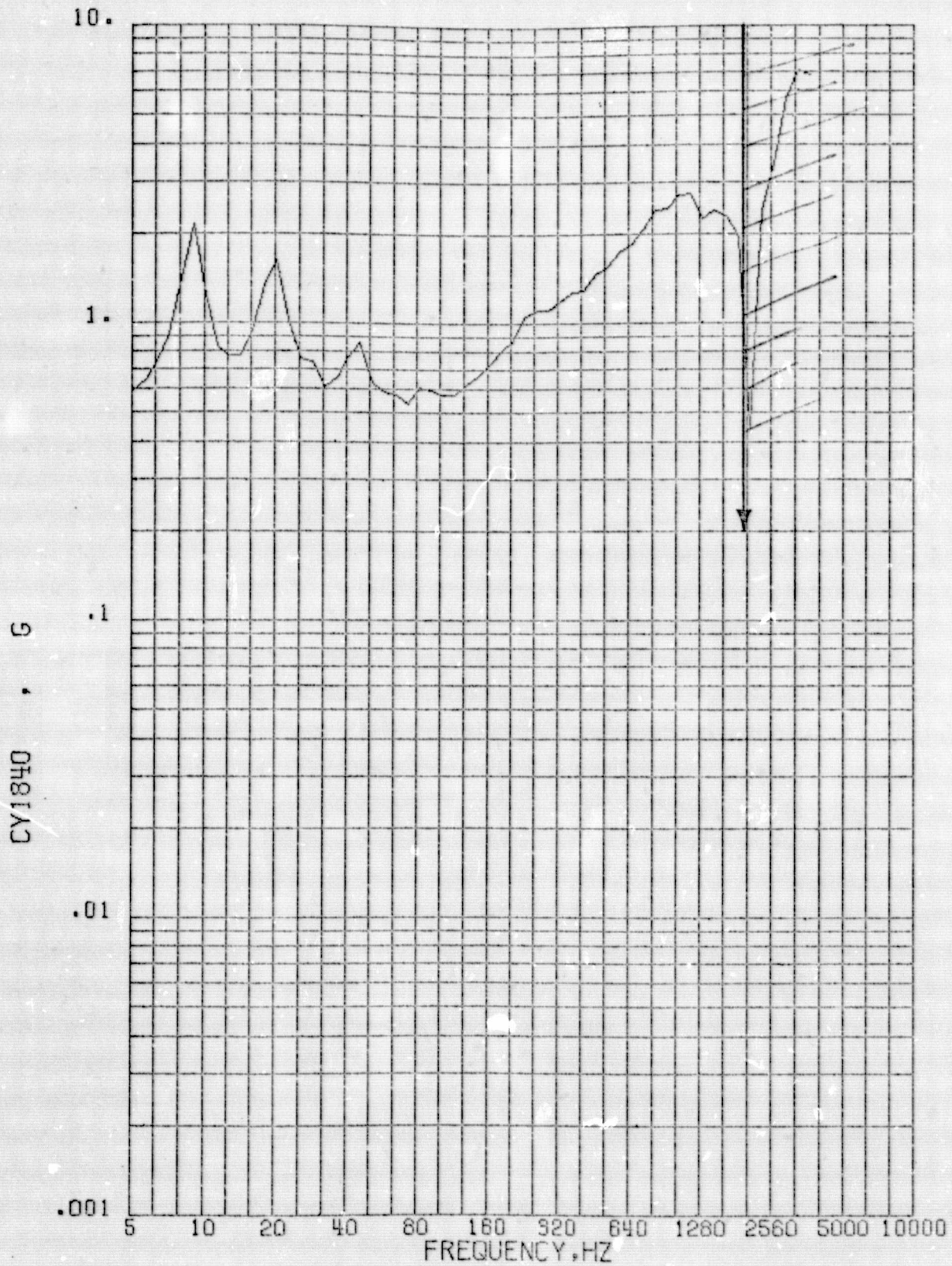
4.21. 6

Figure 4.31b

ORIGINAL PAGE IS
OF POOR QUALITY



SHOCK SPECTRUM



START=67262.9000SEC.

STOP=67265.5000SEC.

Q=10.

VIKING B

JE TT SRM

(GBI)

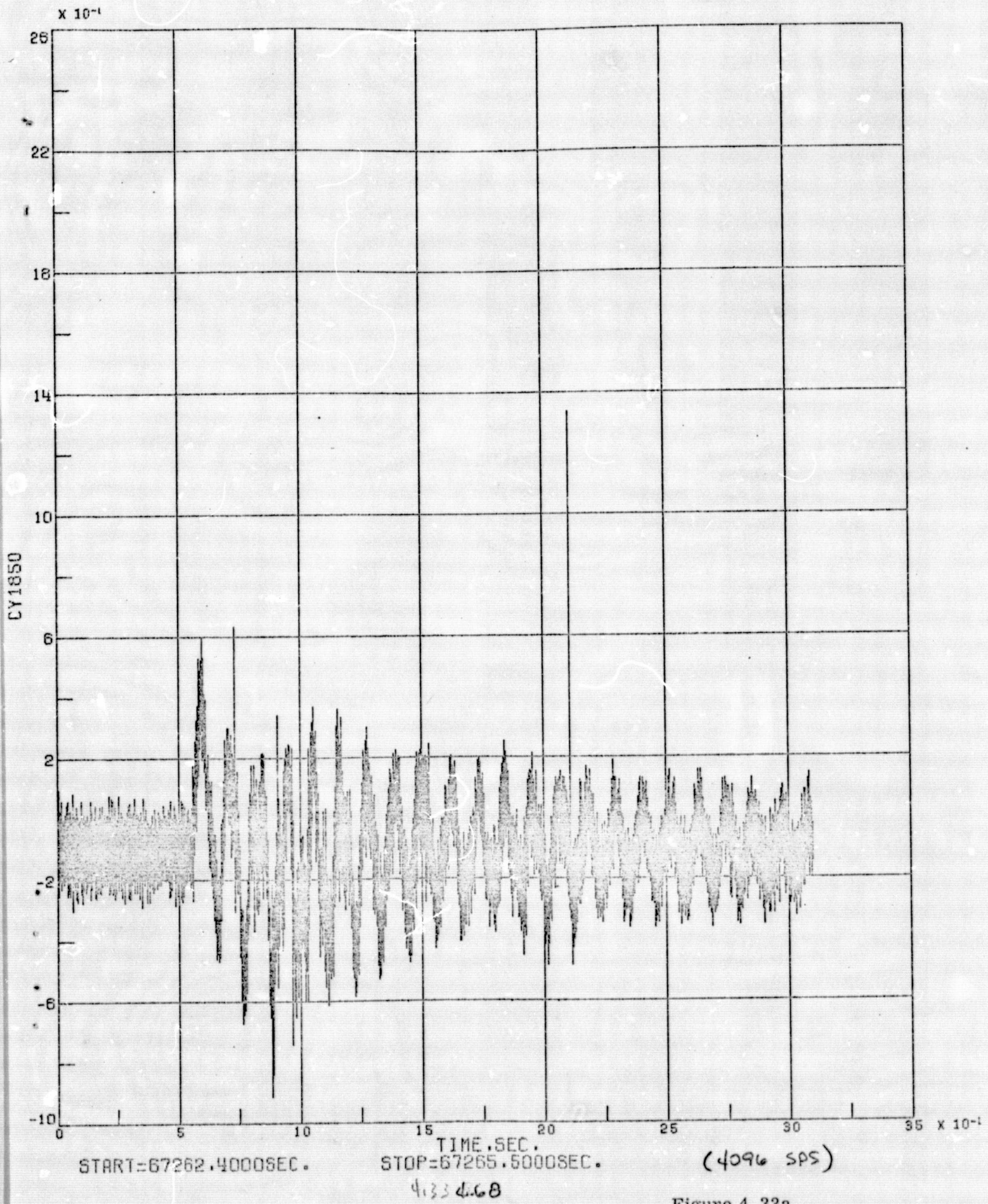
9/ CY1840

4096 SPS

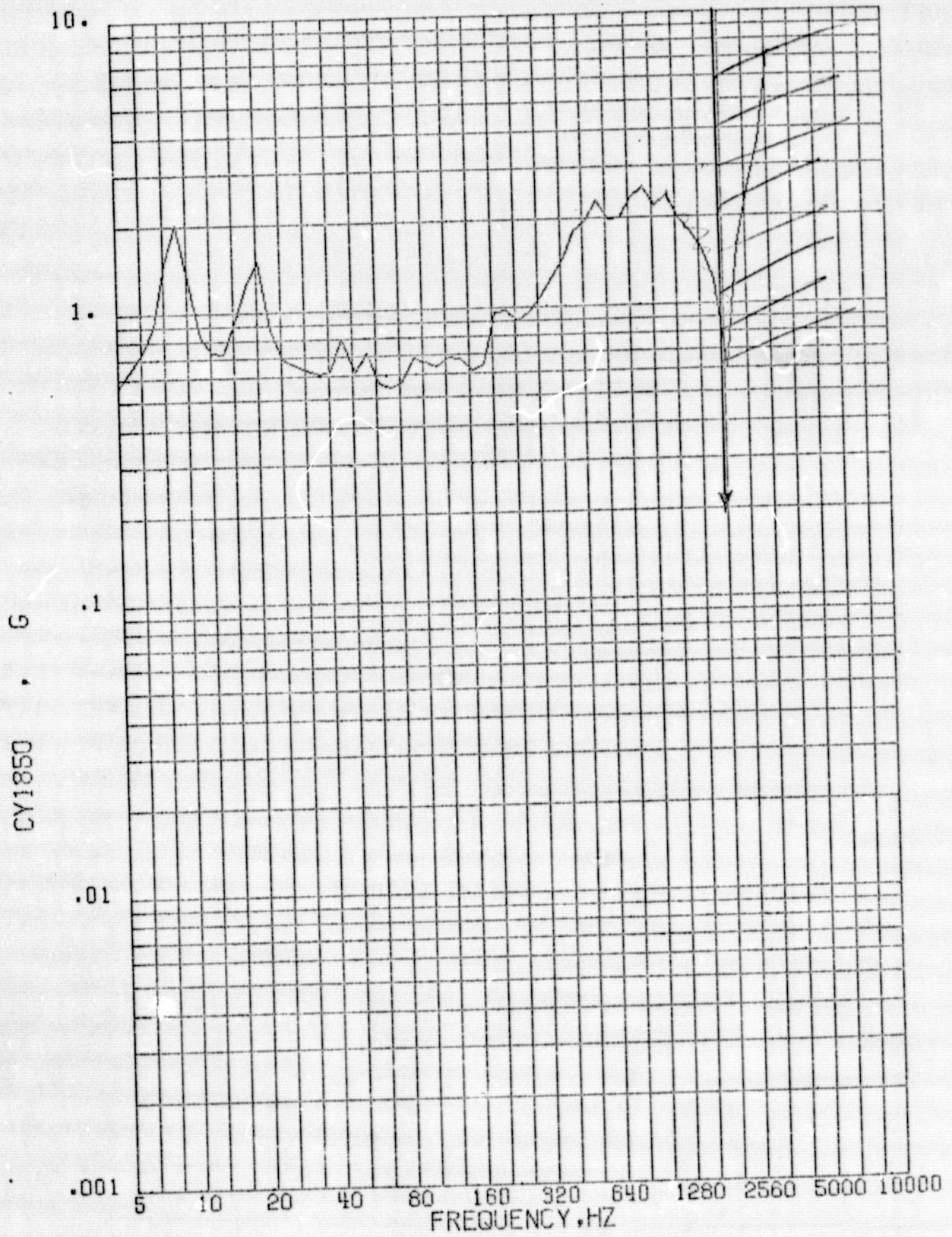
4.24.67

Figure 4.32b

ORIGINAL PAGE IS
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SHOCK SPECTRUM



START=67262.9000SEC.

STOP=67265.5000SEC.

Q=10.

VIKING B

JE TT SRM (GB1)

9/ CY1850

4096 SPS

4.696

Figure 4.33b

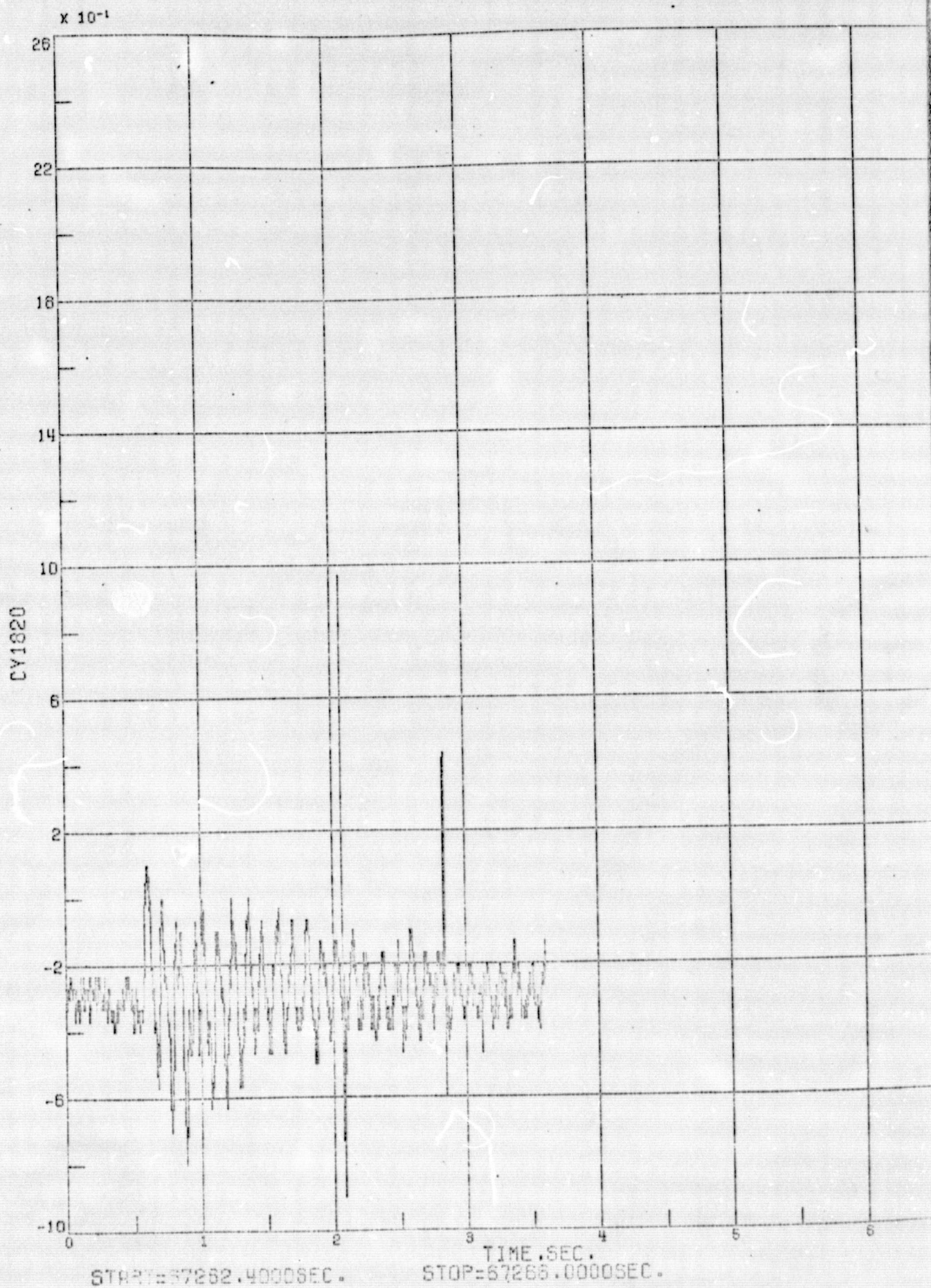
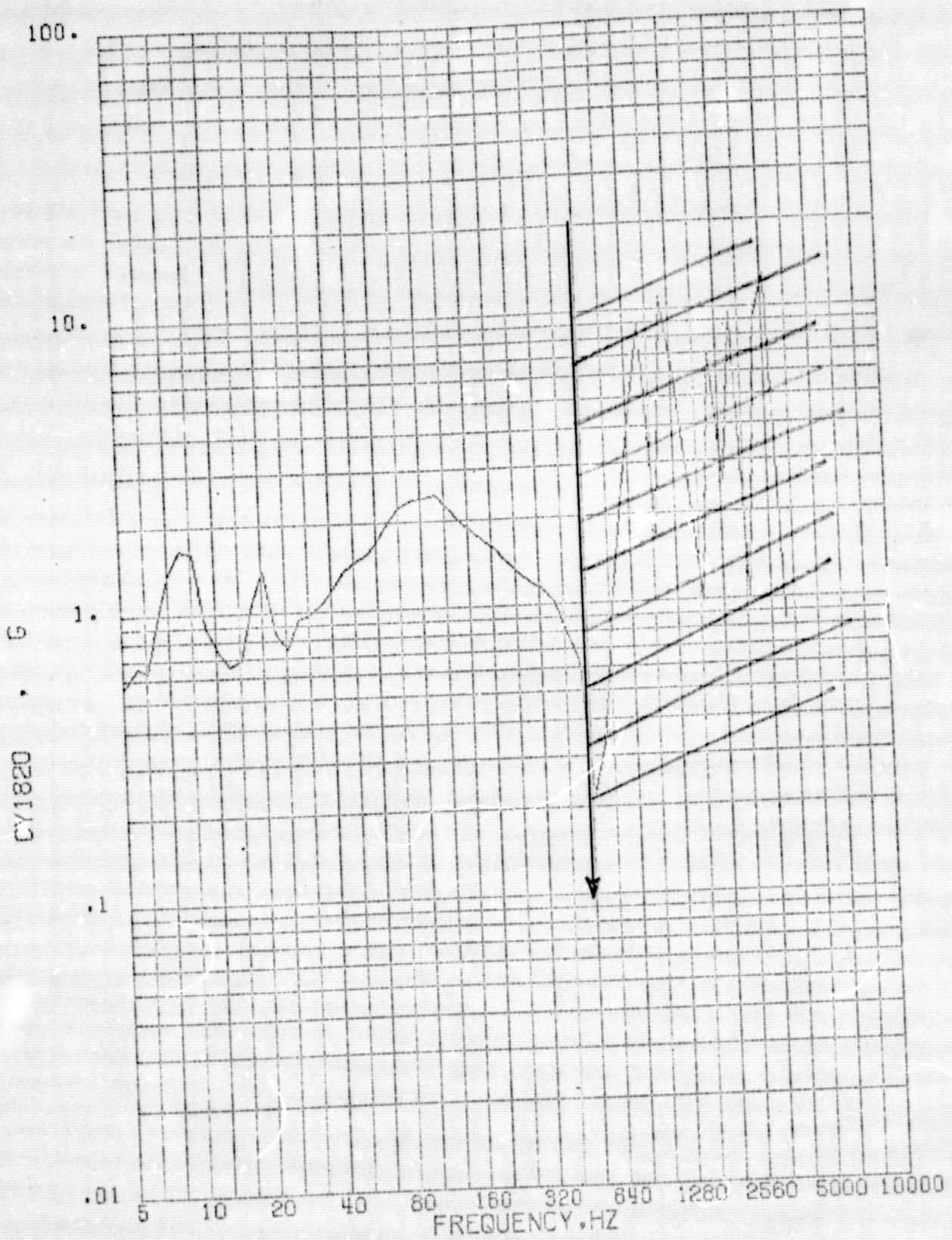


Figure 4.34a

SHOCK SPECTRUM



START=67262.9000SEC.

STOP=67266.0000SEC.

Q=10.

VIKING B

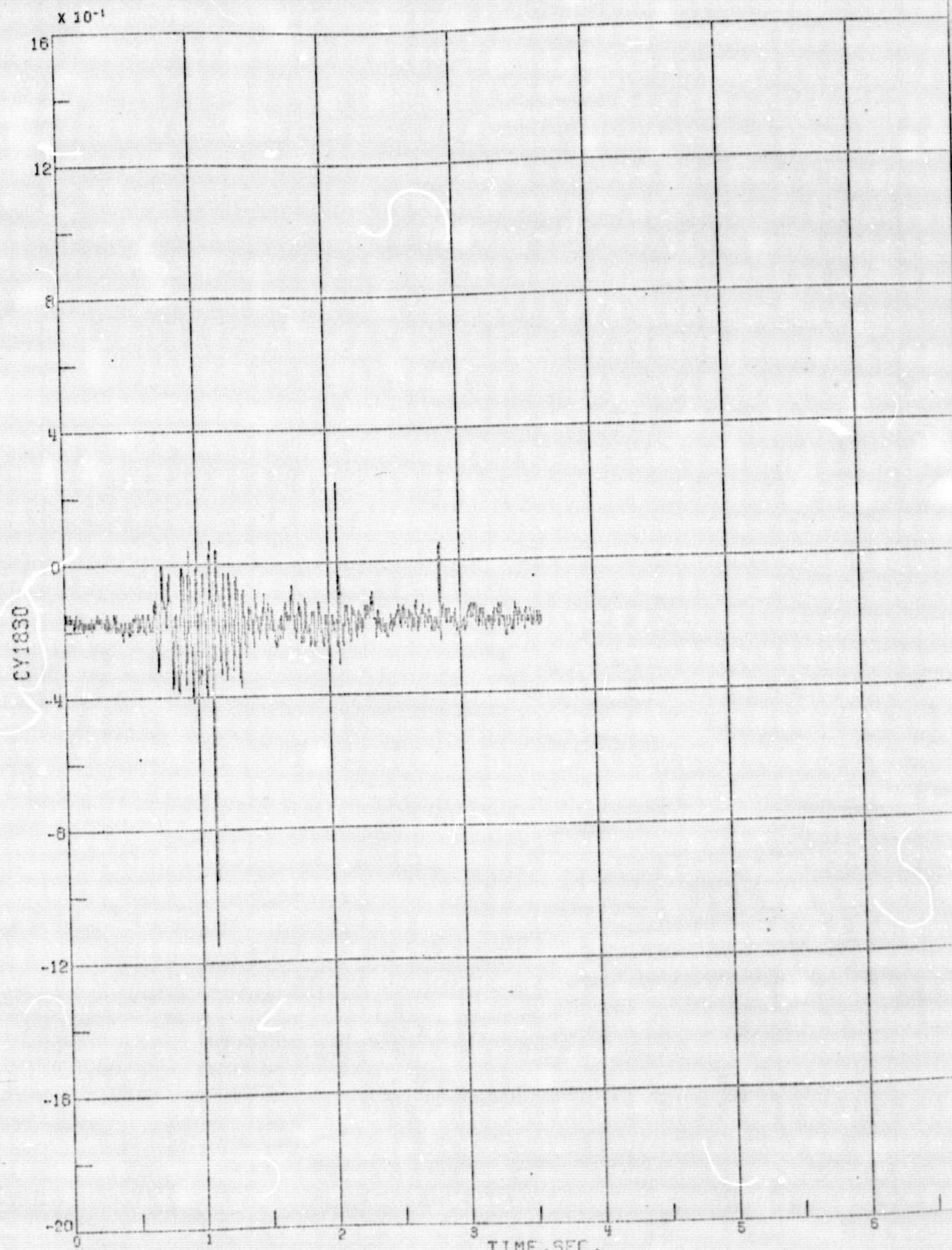
JE TT SRM(GSI)

102V

S/ CY1820

44571/2

Figure 4.34b

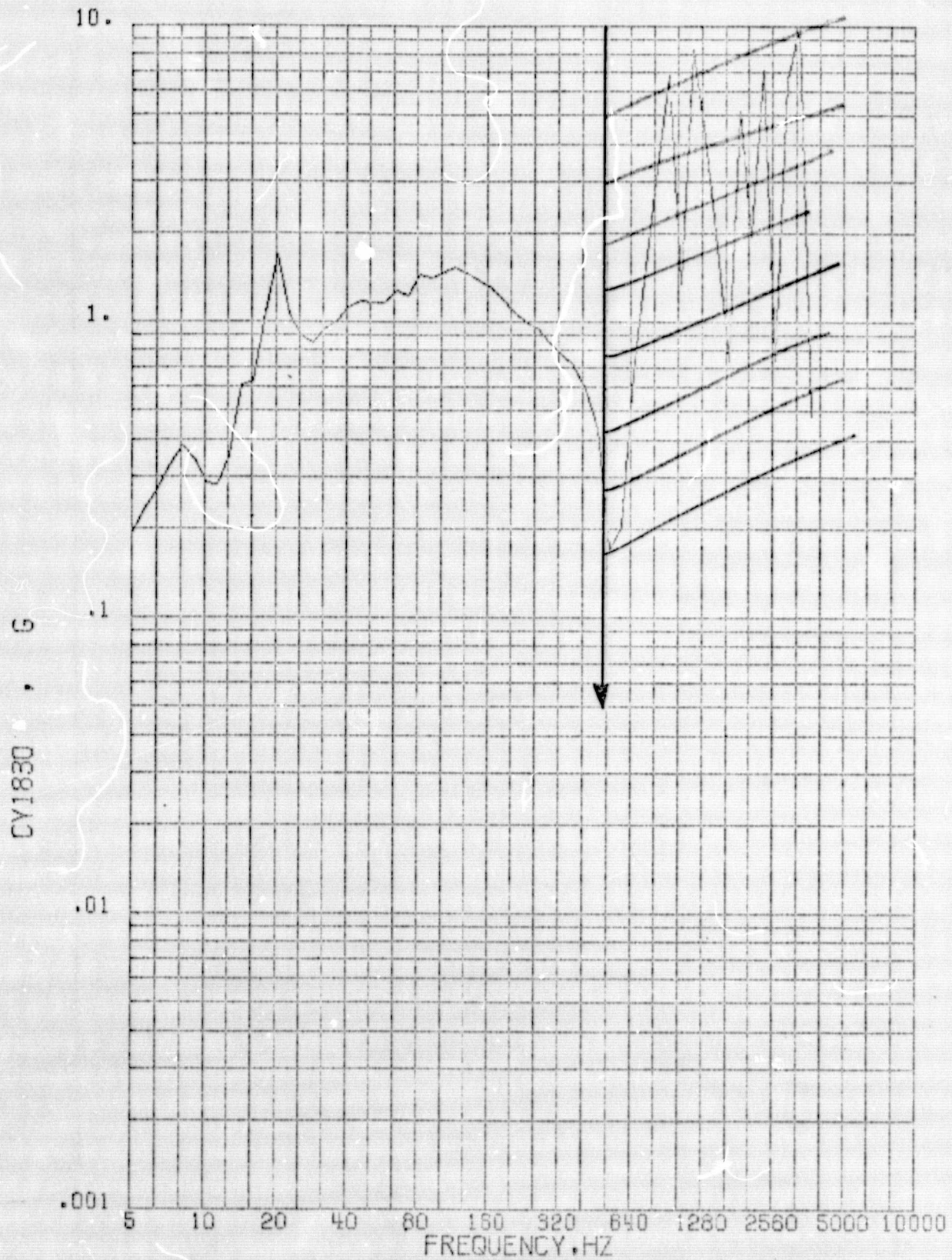


START=67252.4000SEC.

STOP=67266.0000SEC.

44.72

SHOCK SPECTRUM



START=67262.9000SEC.

STOP=67266.0000SEC.

Q=10.

VIKING B

JE TT SRM(GBI)

S/ CY1830

d, 34.73

Figure 4.35b

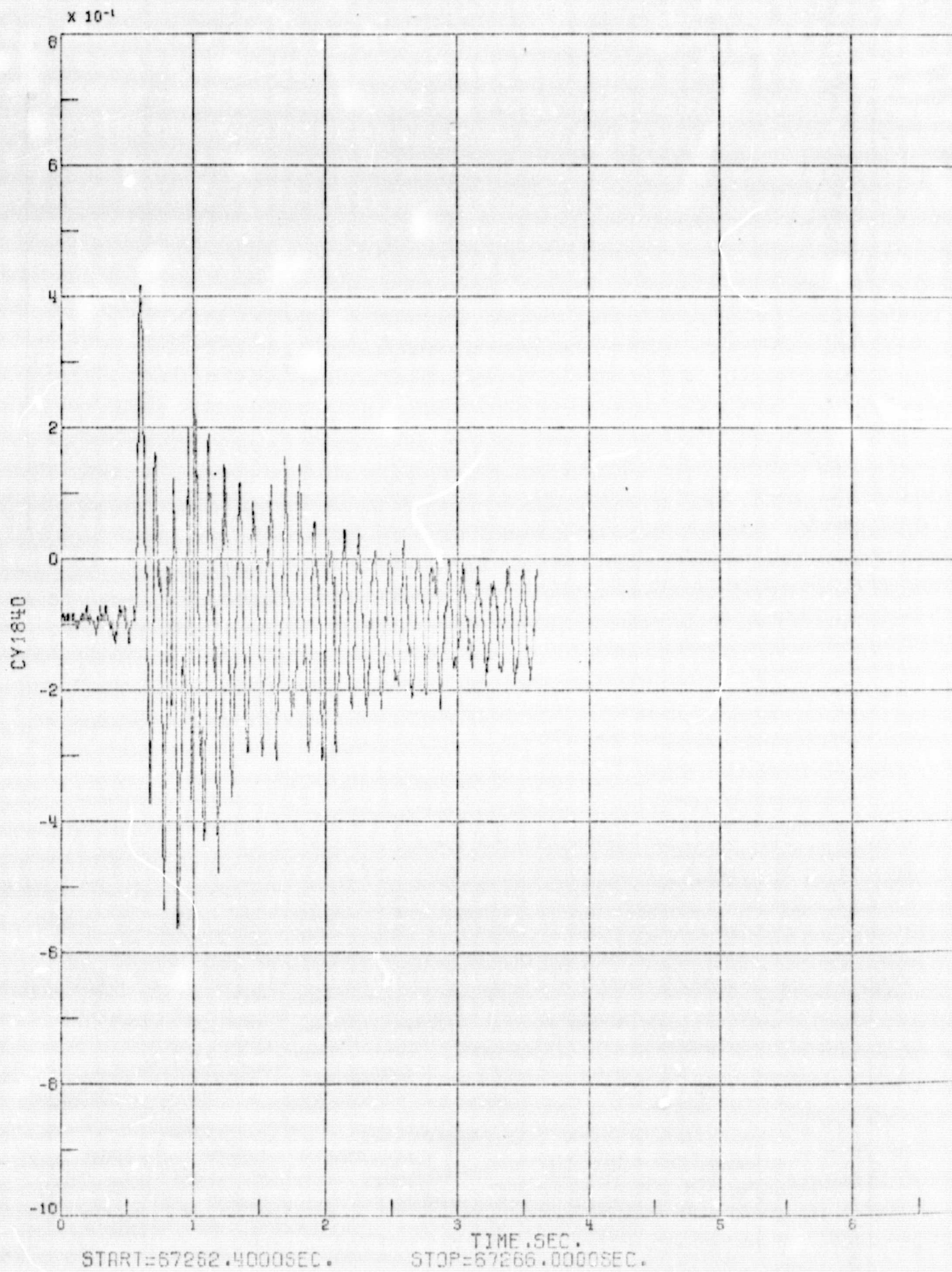
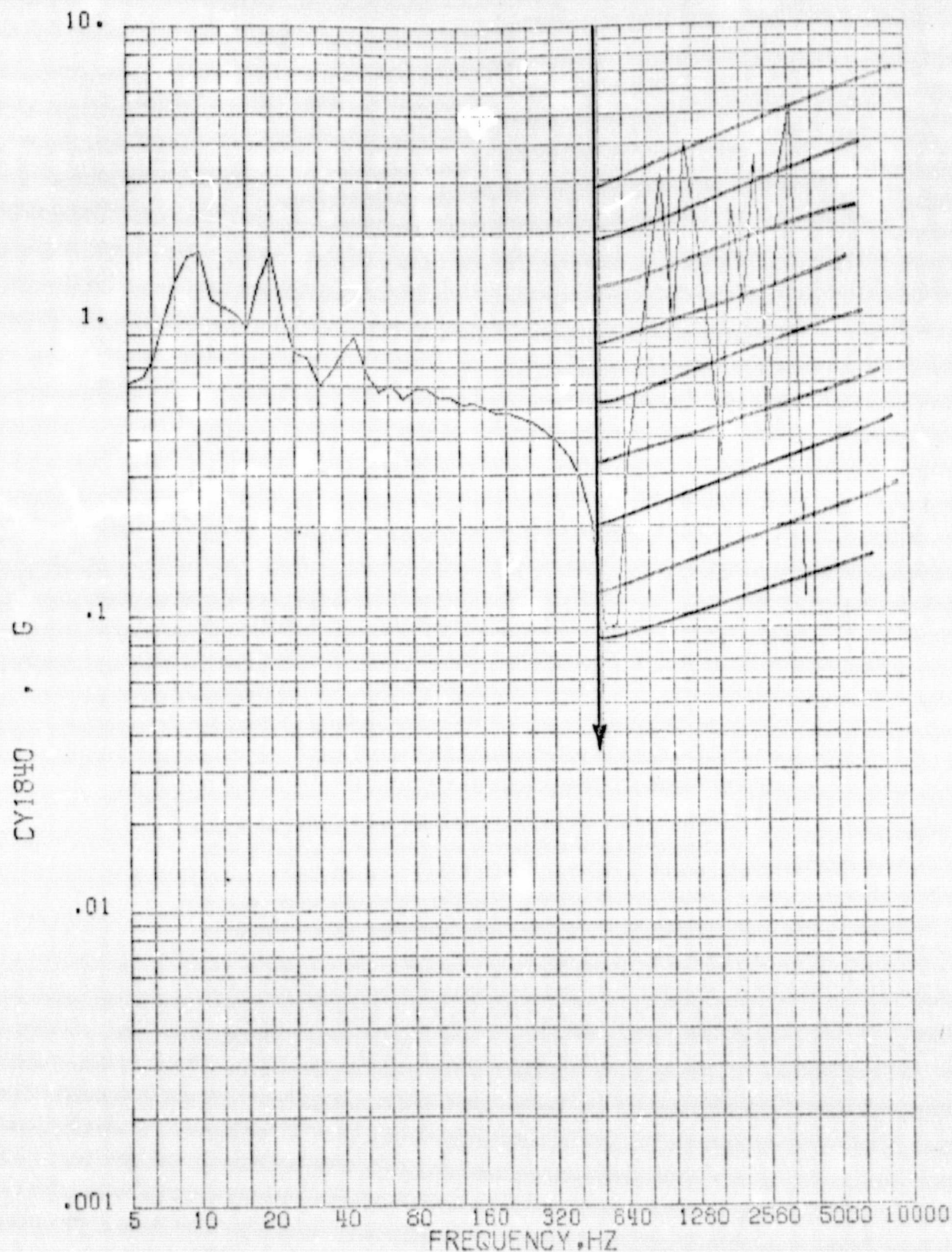


Figure 4.36a

SHOCK SPECTRUM



START=67262.9000SEC.

STOP=67266.0000SEC.

Q=10.

VIKING B

JE TT SRM(GBI)

1024

S/ CY1840

4.75
4.35

Figure 4. 36b

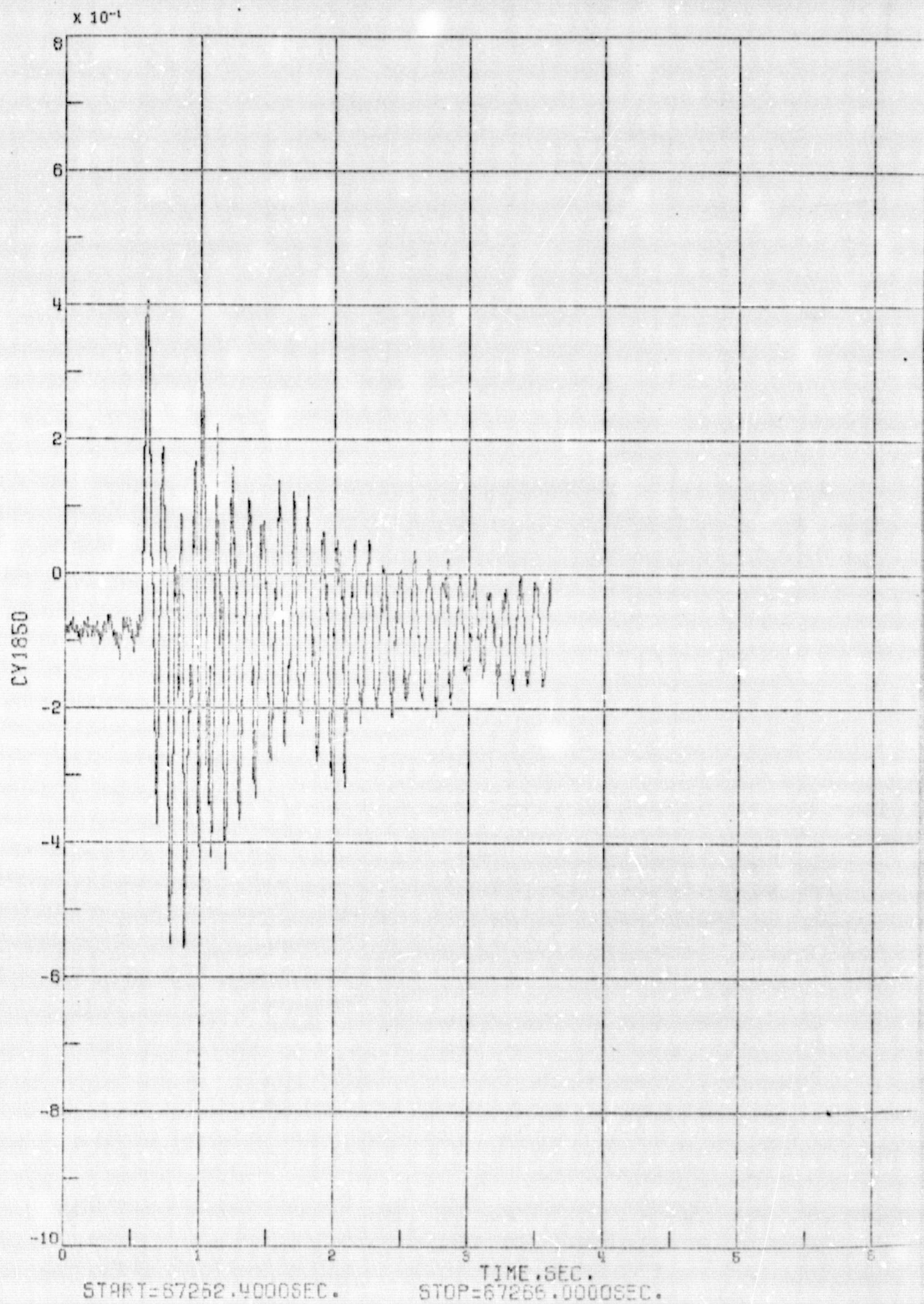
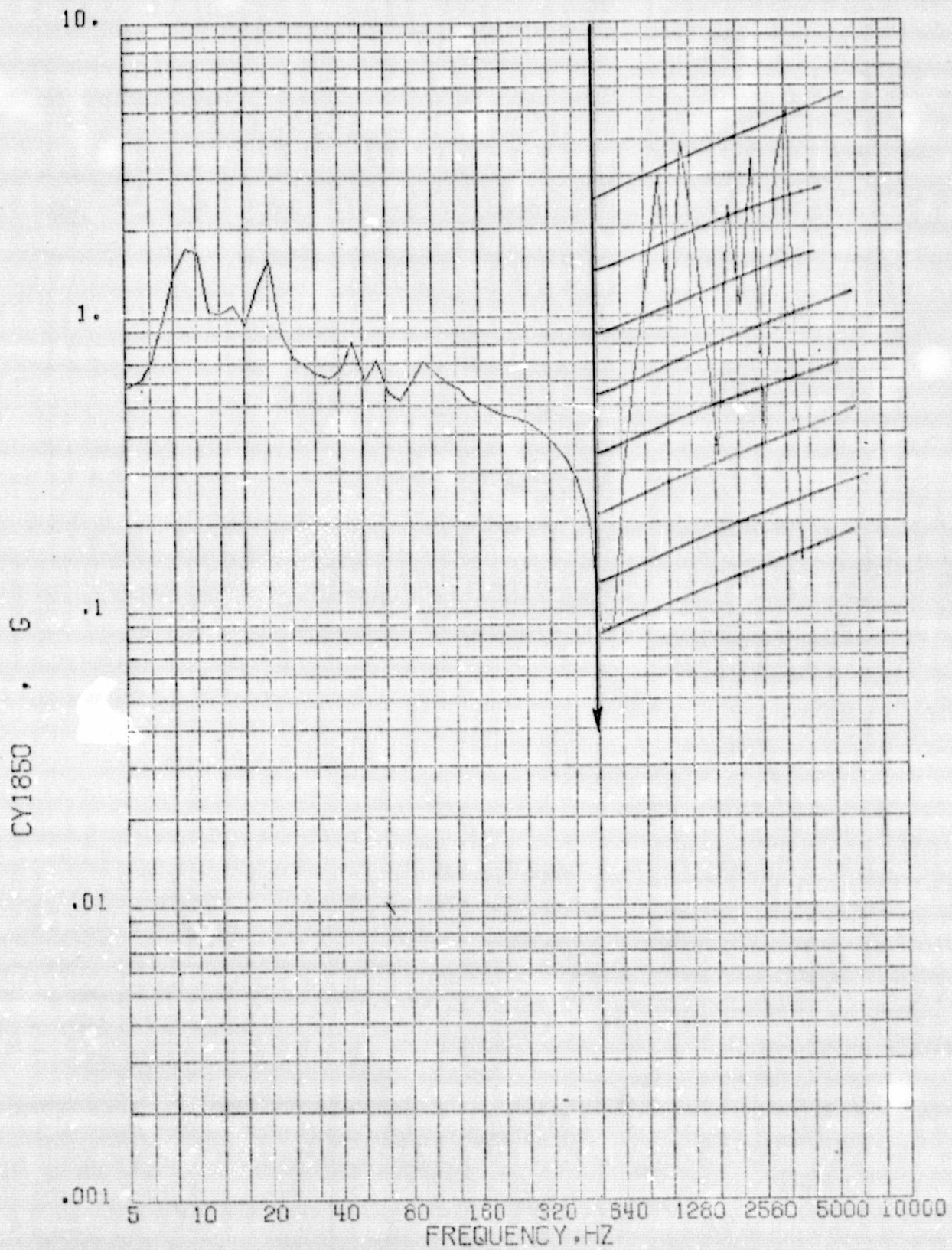


Figure 4.37a

SHOCK SPECTRUM



START=67262.90003EC.

STOP=67266.00003EC.

Q=10.

VIKING B

JE TT SRM(GBI)

1024

S/ CY1850

4,477

Figure 4.37b

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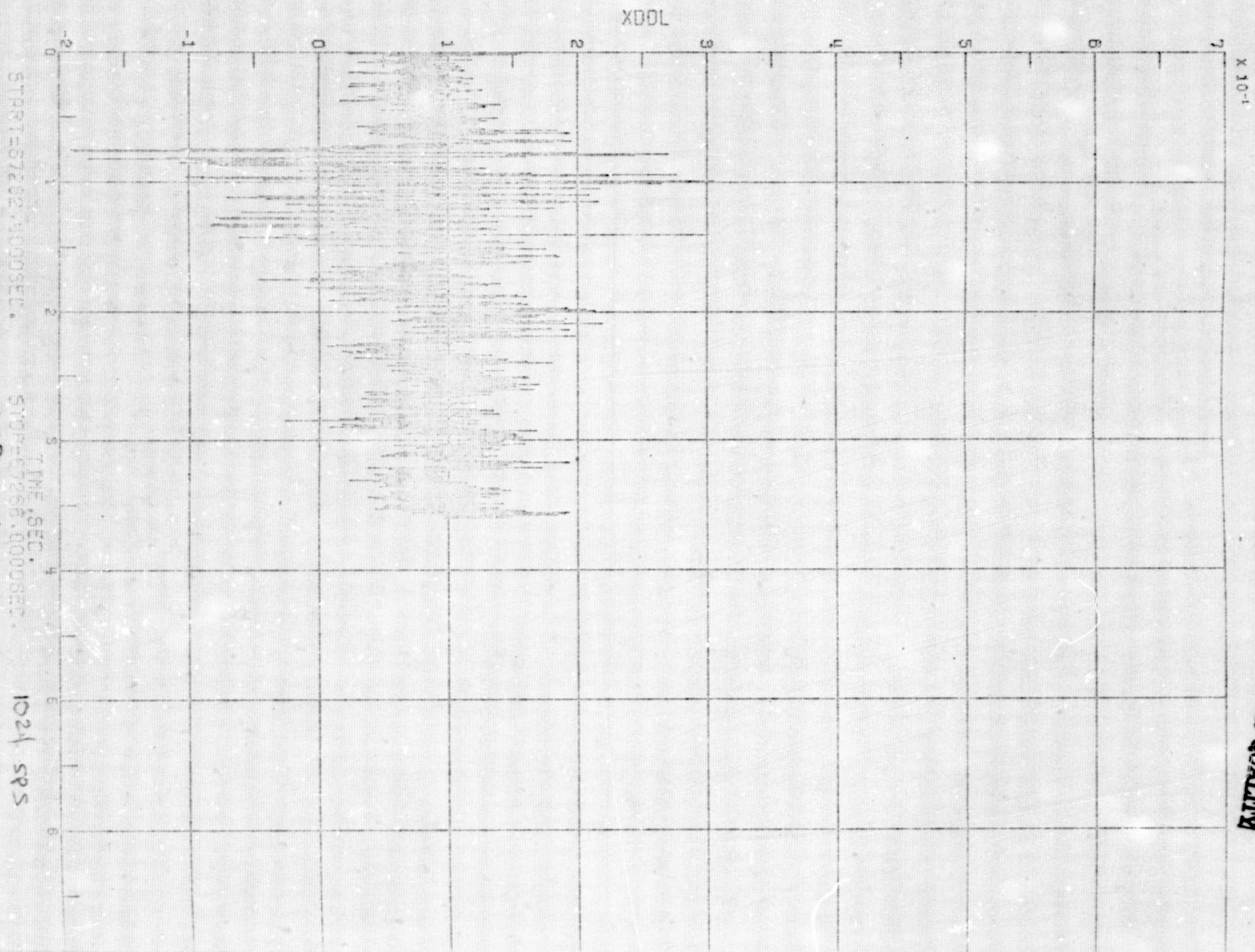
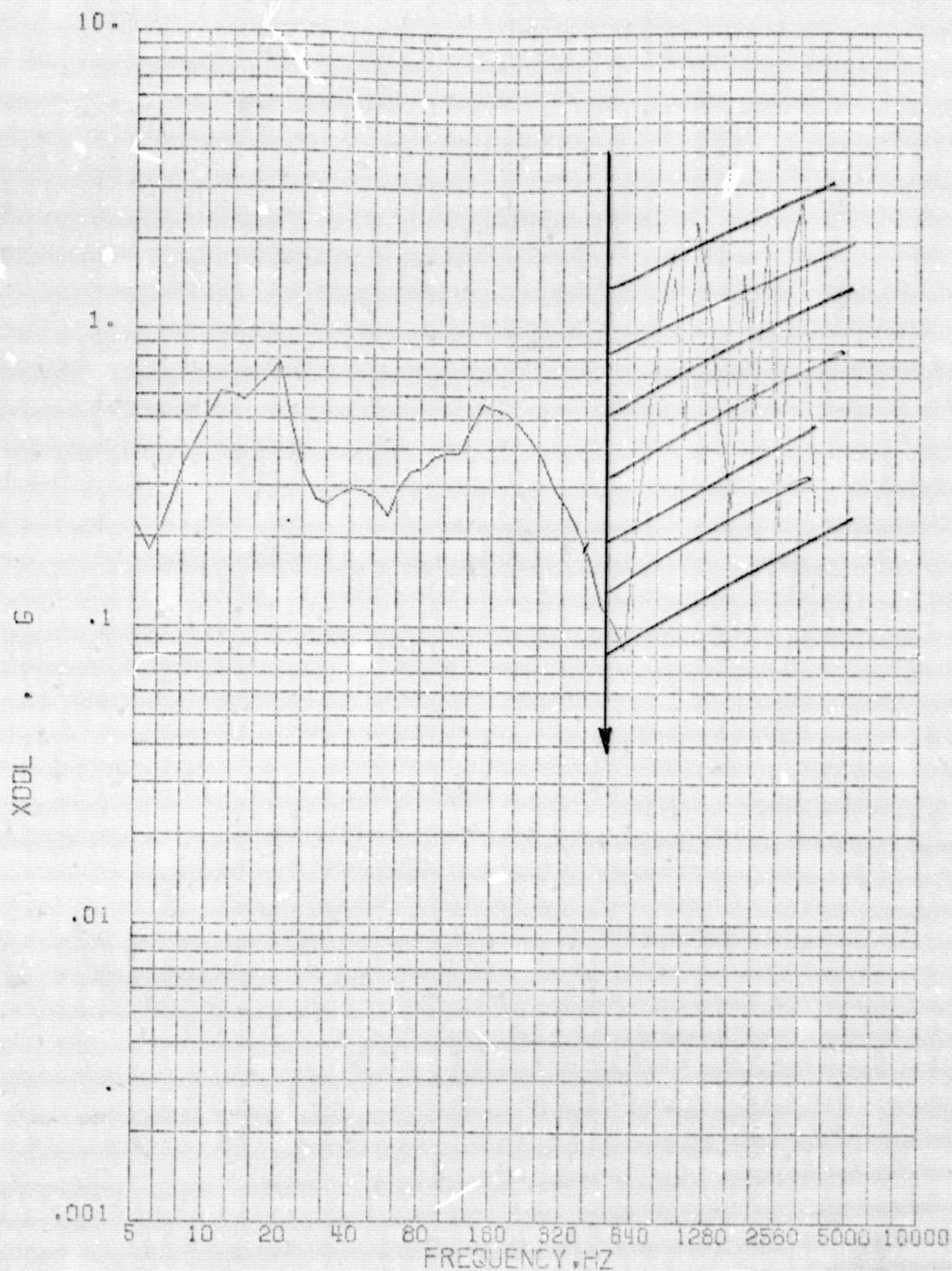


Figure 4.38a

SHOCK SPECTRUM



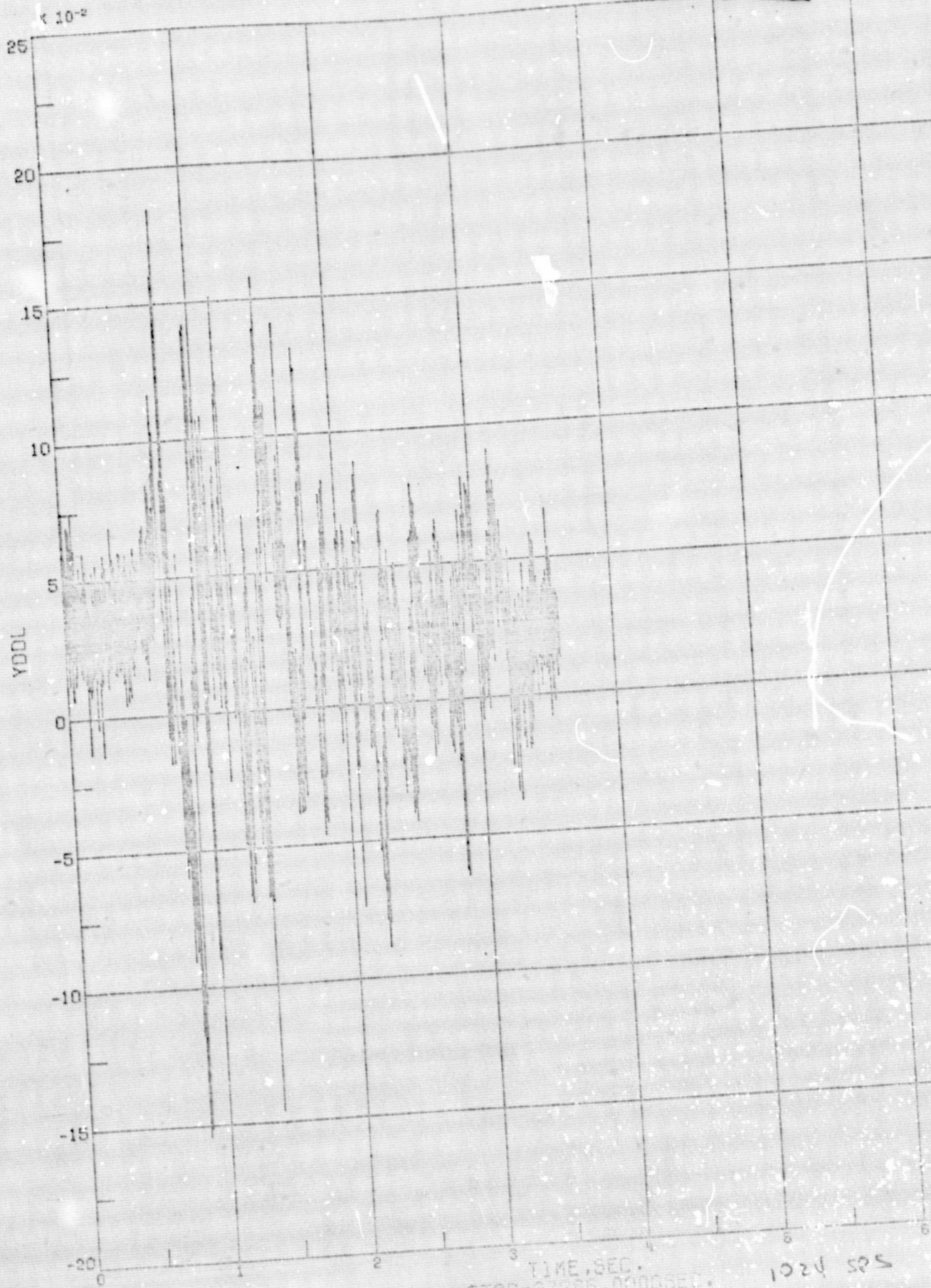
START=67262.9000SEC. STOP=67266.0000SEC. Q=10.

VIKING 8 JE TT 8RM(GBI) 1024 SPS 9/ XDDL

4.38h
4.79.

Figure 4.38b

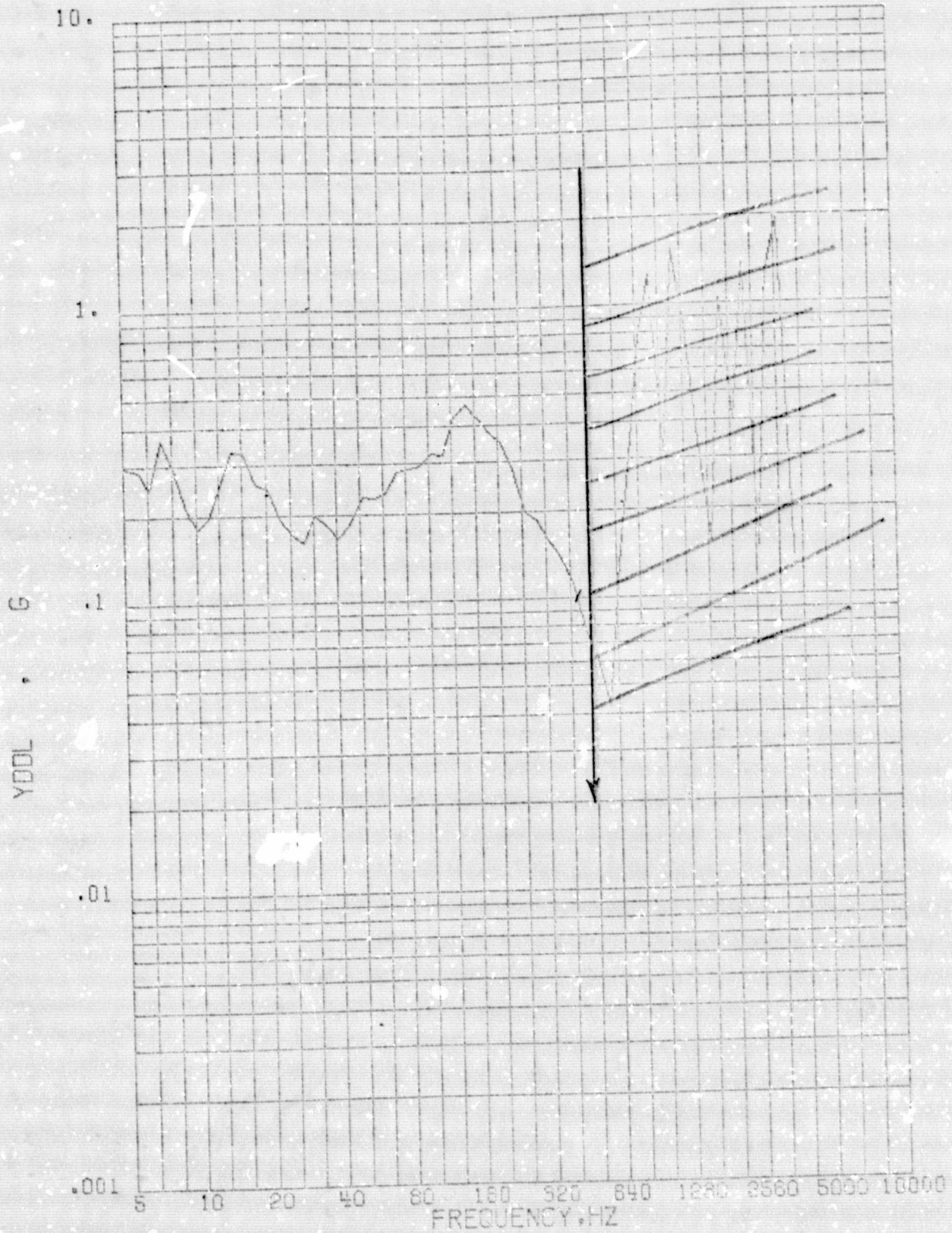
ORIGINAL PAGE IS
OF POOR QUALITY



4, 39 4.80

Figure 4.39a

SHOCK SPECTRUM



START=E7262.9000SEC. STOP=E7266.0000SEC. Q=10.

VIKING B JE TT SRM(CBI) 1024 ses 9/ YBOL

U 401

Figure 4.39b

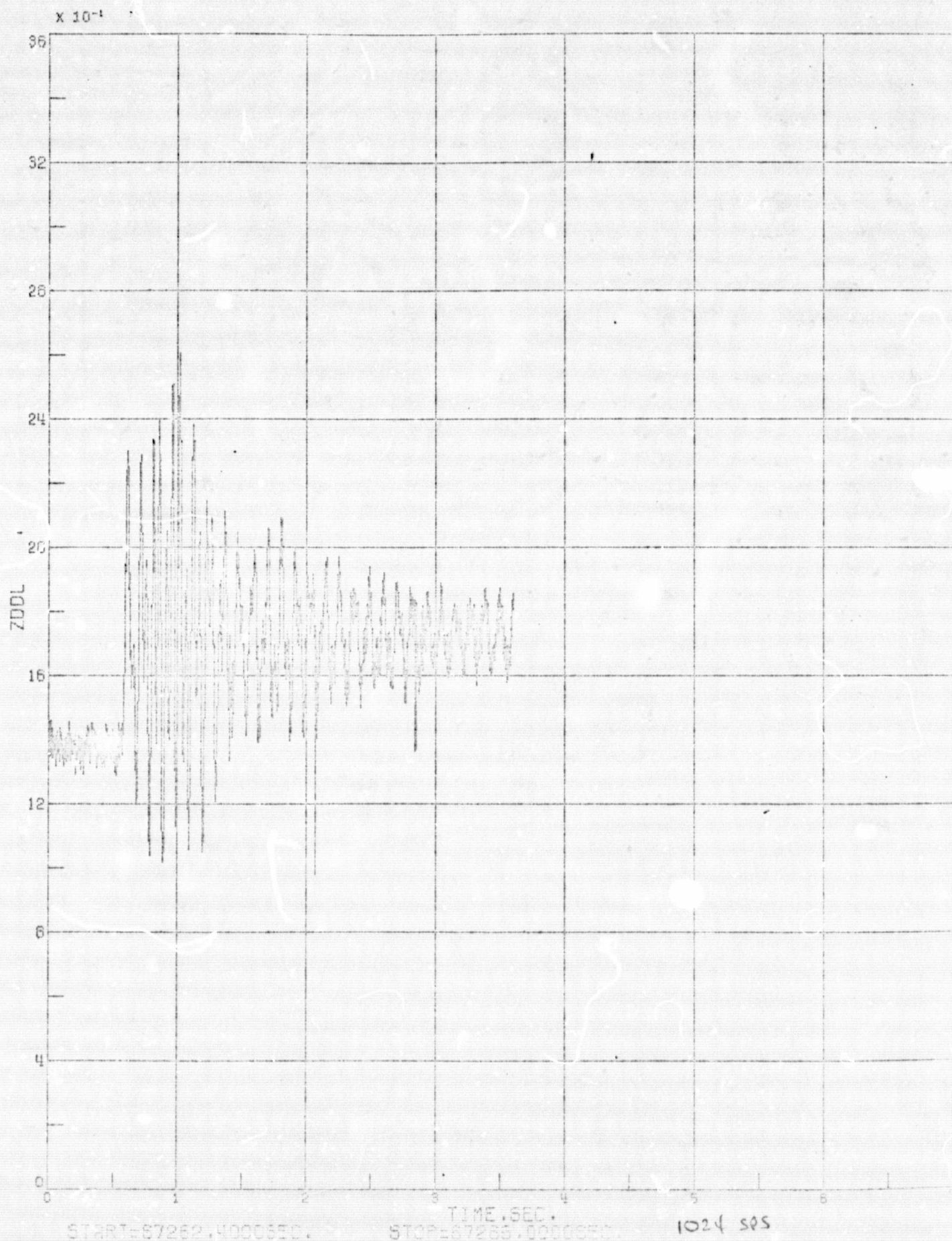
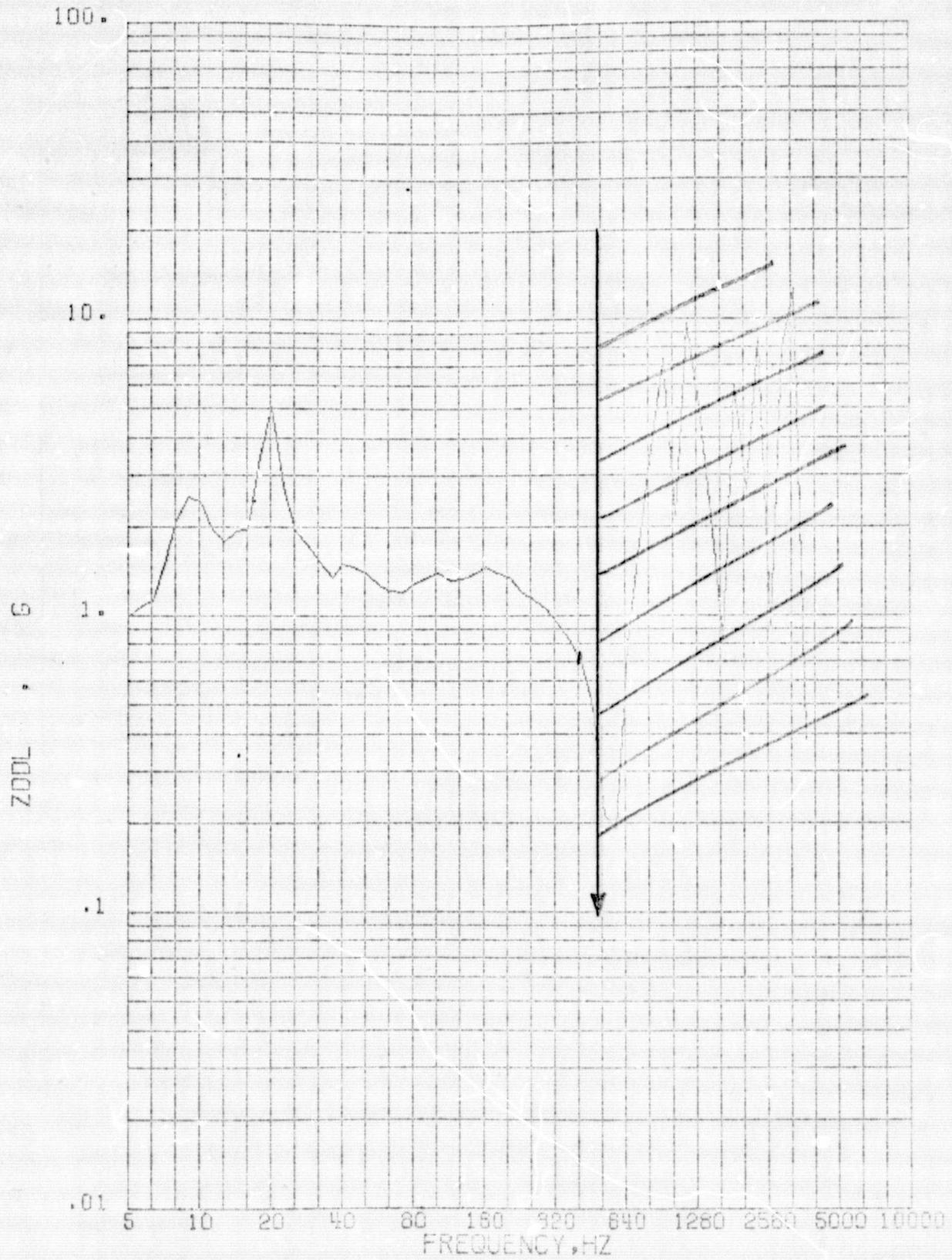


Figure 4.40a

SHOCK SPECTRUM



START=67262.9000SEC. STOP=67266.0000SEC. Q=10.

VIKING B JE TT 58M(GBI) 1024 SPS 9/ ZDDL

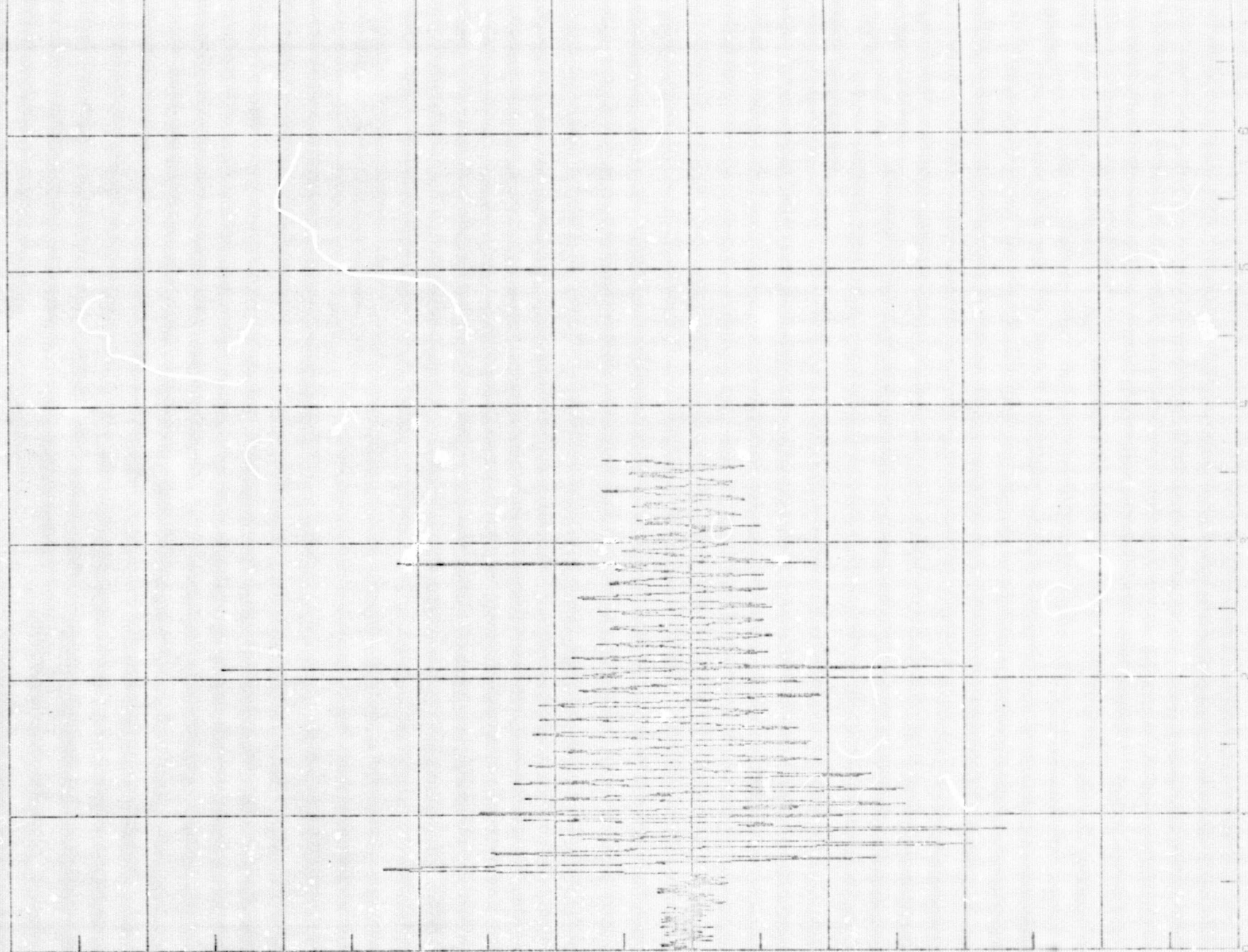
4.03

Figure 4.40b

$\times 10^{-1}$

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

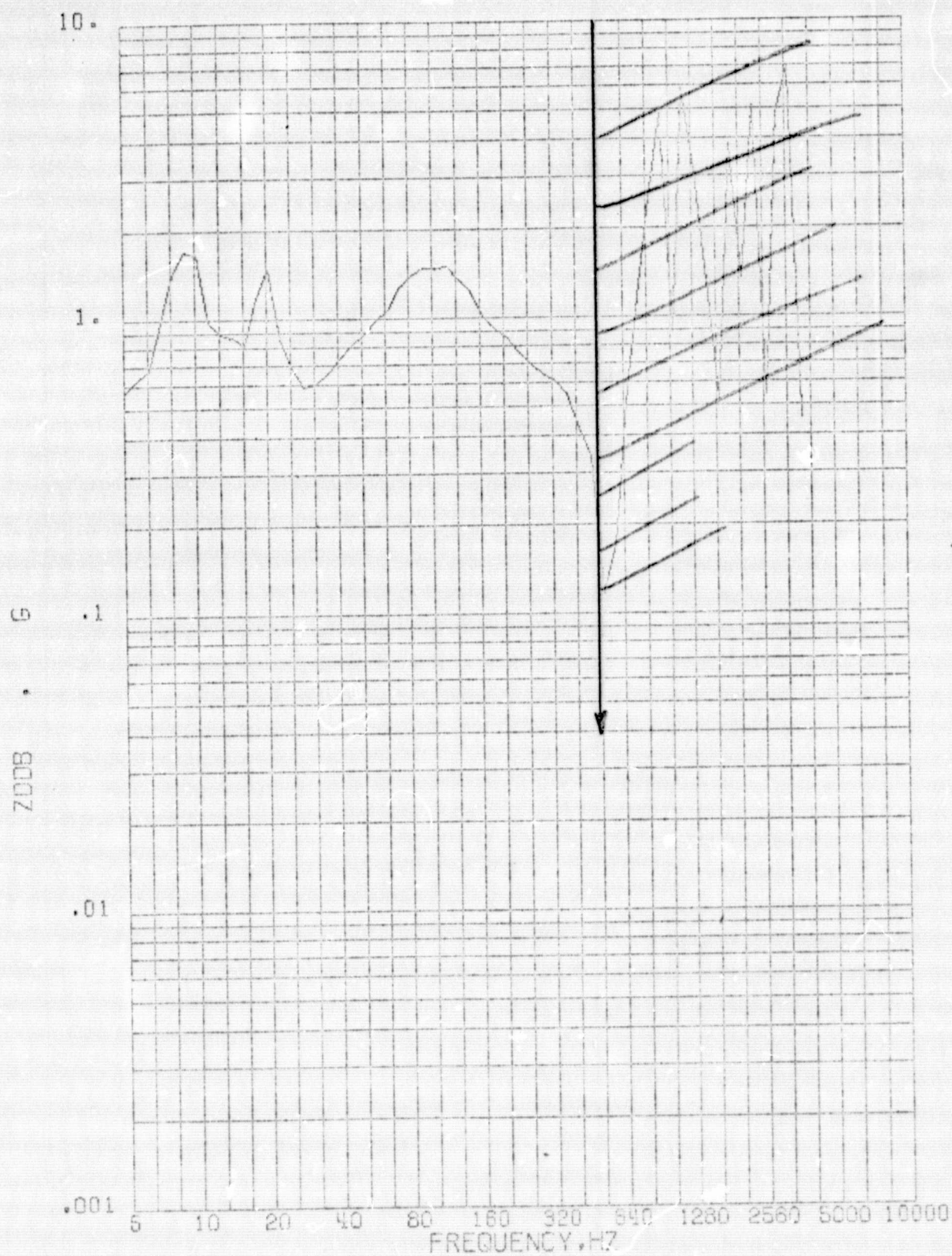
ZDD8



START=67262.4000SEC. TIME, SEC. 1024 SPS
STOP=67266.0000SEC.

0.01 4.84

SHOCK SPECTRUM



START=67260.9000SEC.

STOP=67266.0000SEC.

Q=10.

VIKING B

JE TT SRM(GBI)

1024 SPS

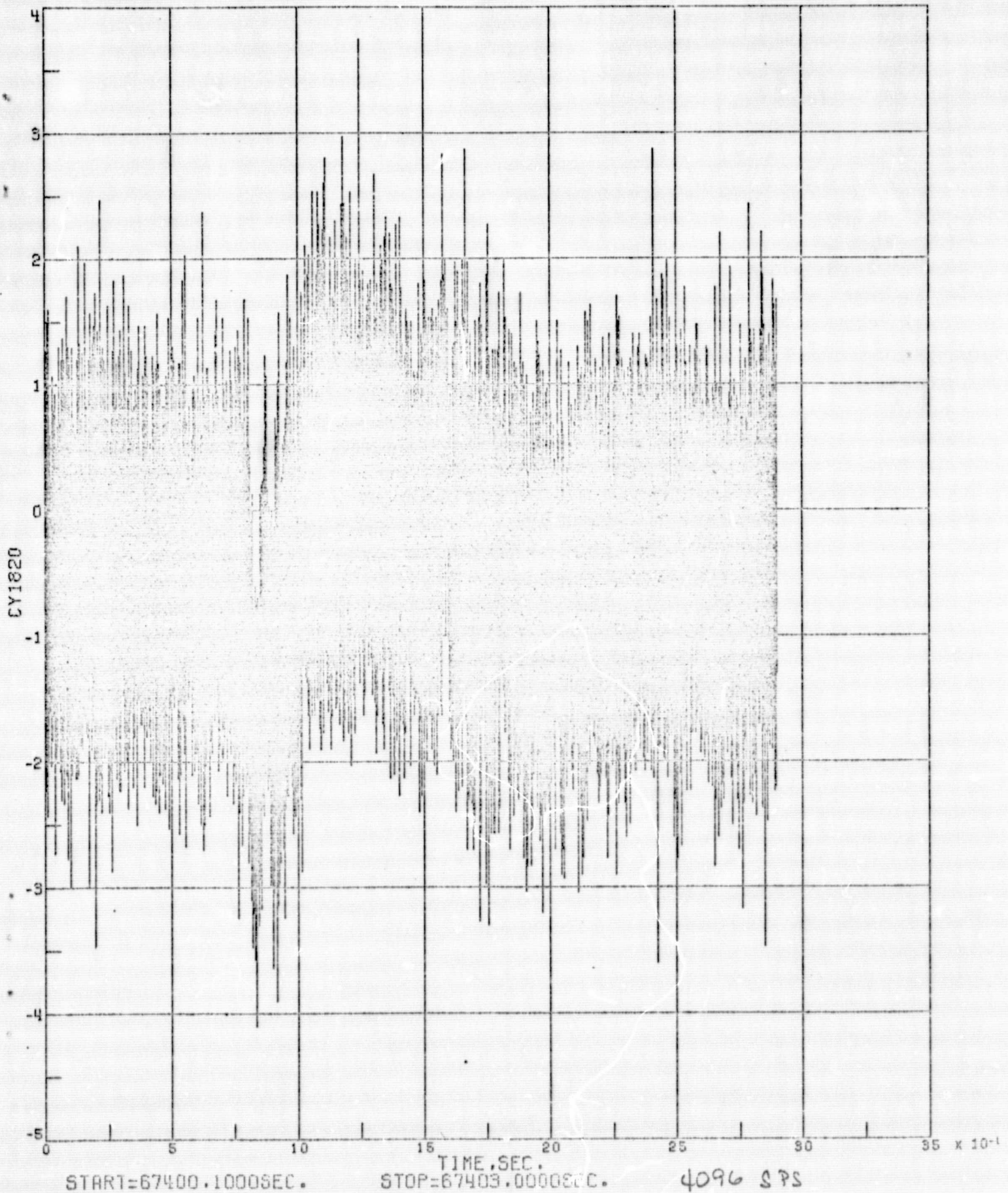
5

ZODB

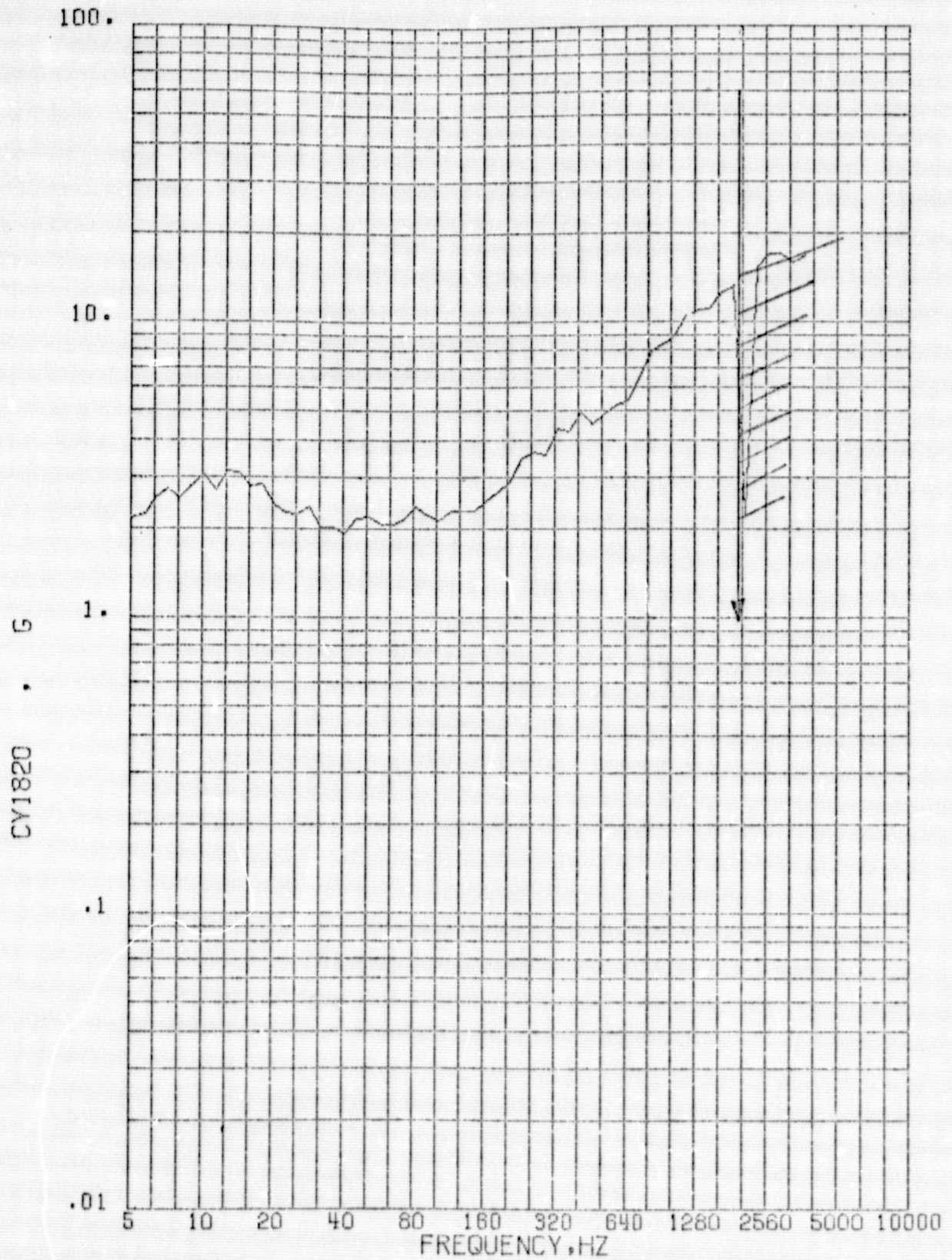
4.41, 4.85

Figure 4.41b

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SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67403.0000SEC.

Q=10.

VIKING B

ST G 1 80/STG 2 IGN(GBI)

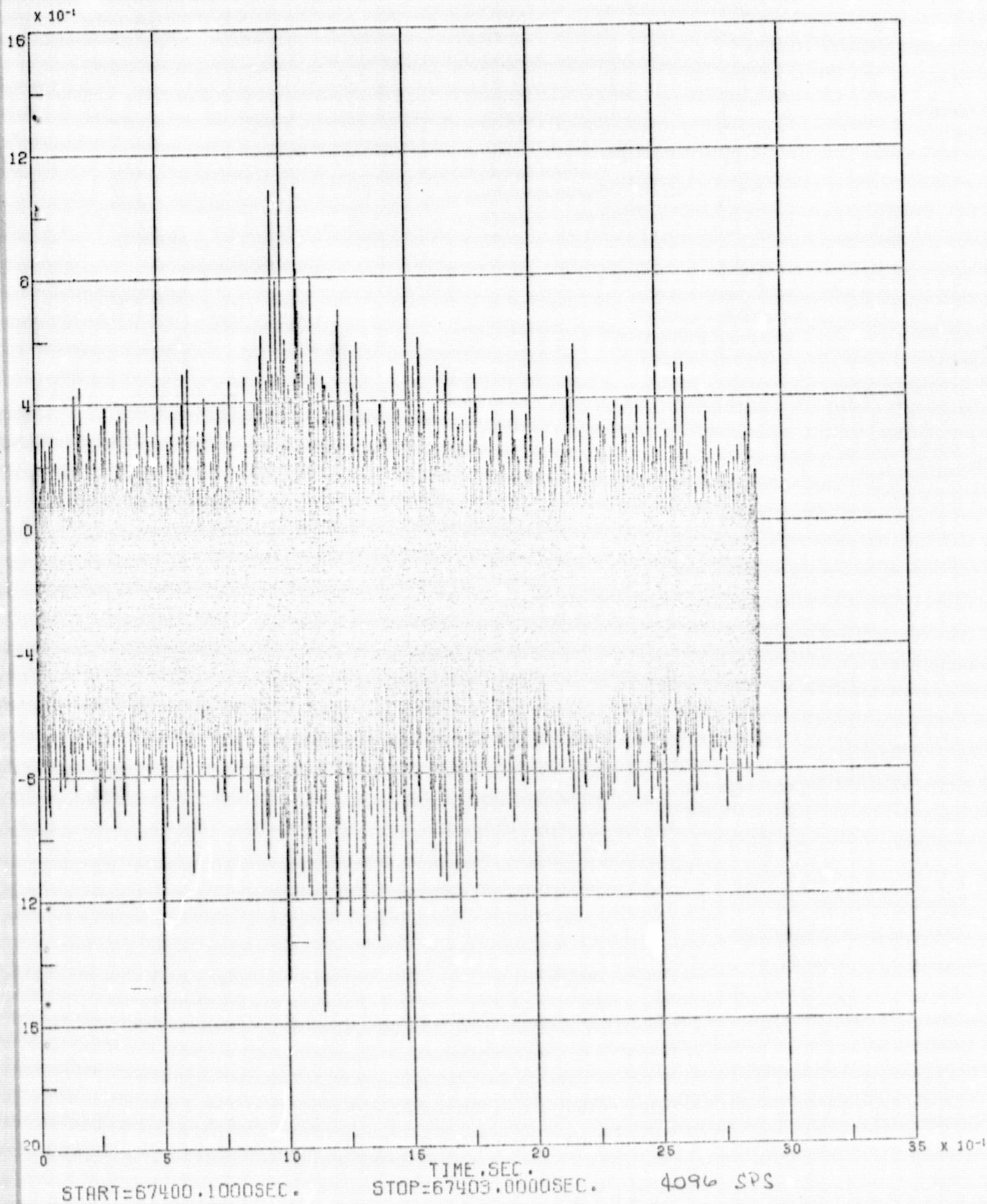
9/ CY1820

4096 (SPS)

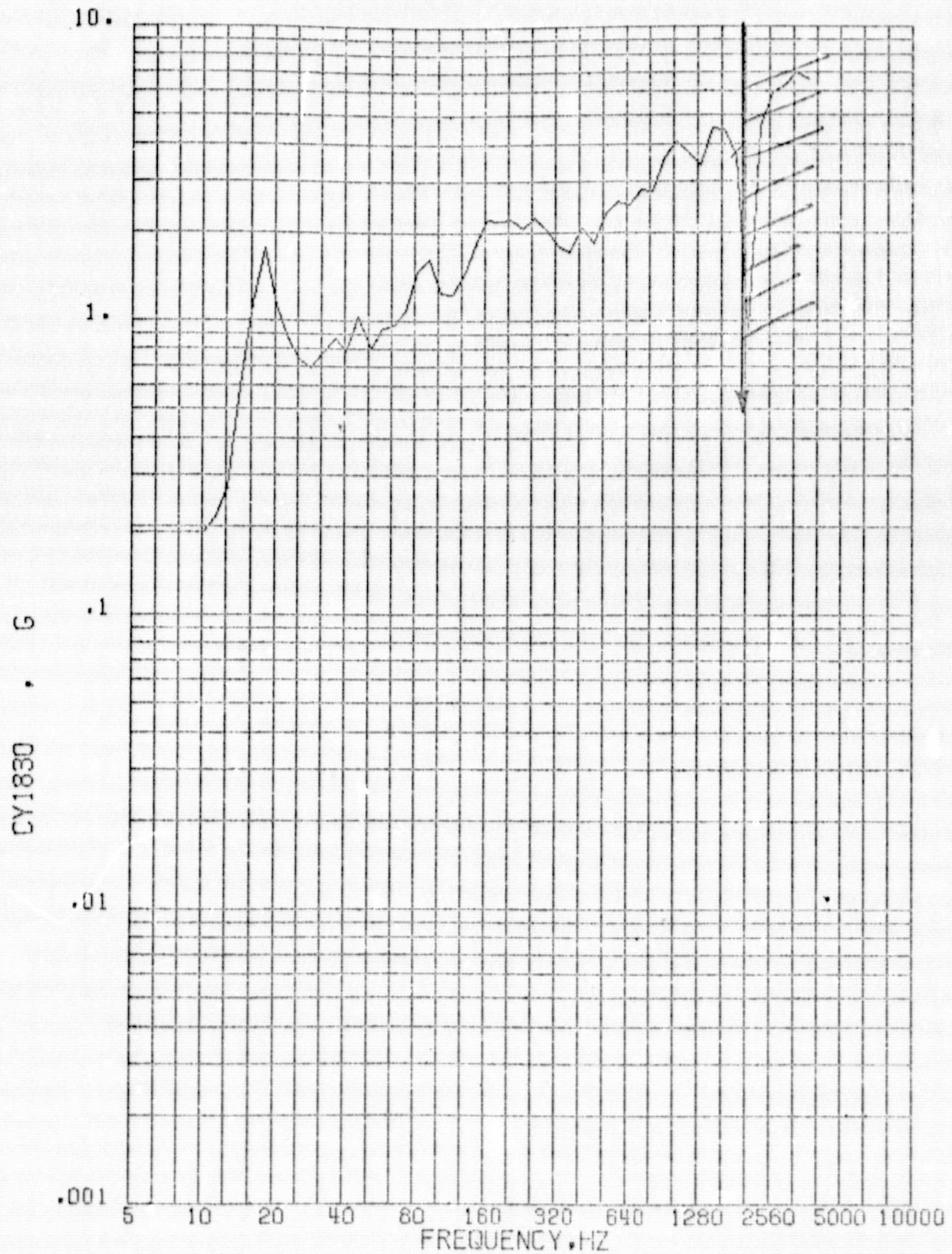
4.42 b 4.87

Figure 4.42b

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SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67403.0000SEC.

Q=10.

VIKING B

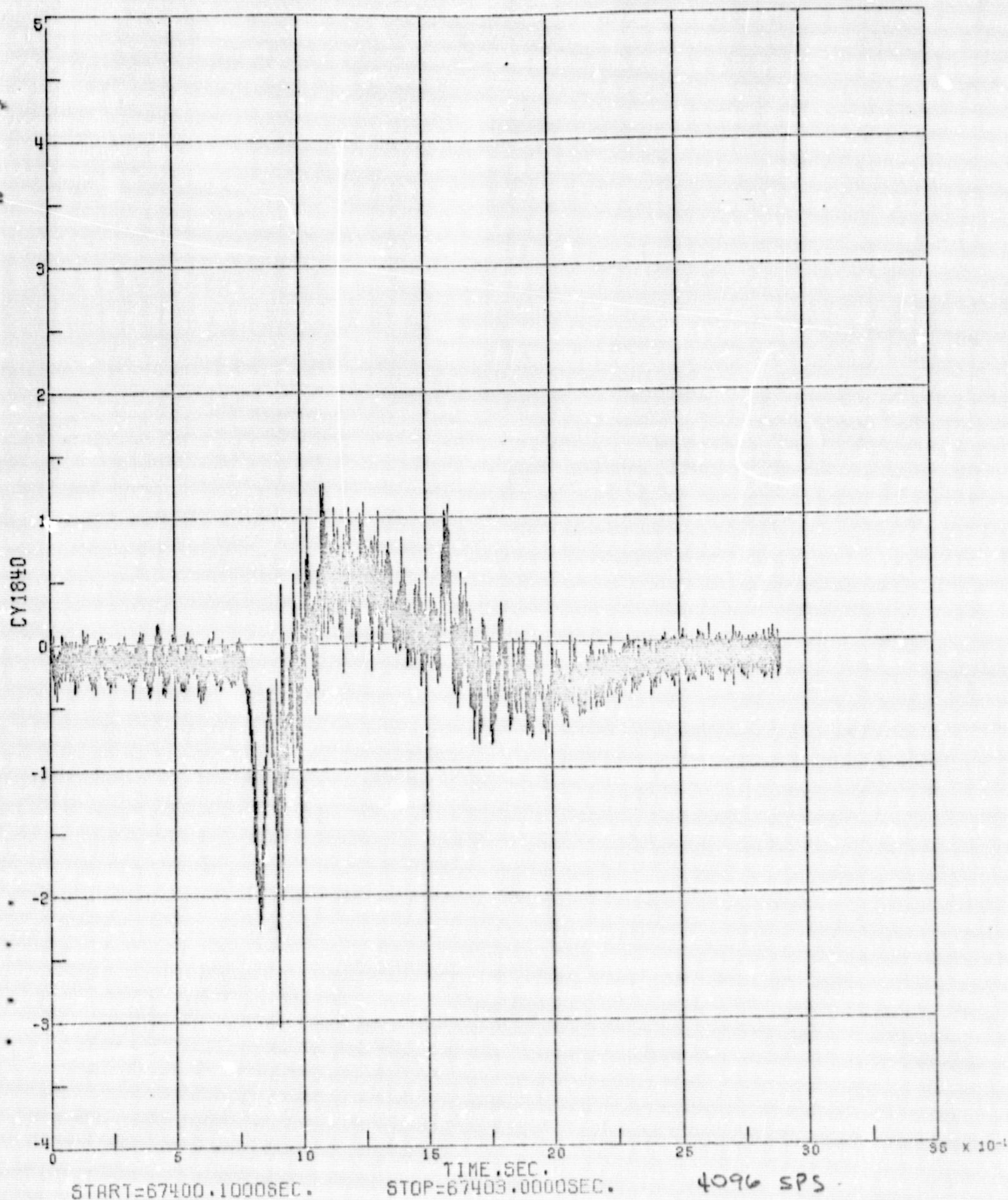
ST G 1 BO/STG 2 IGN(GBI)

9/ CY1830

4096 SPS

4.43 b 4.89

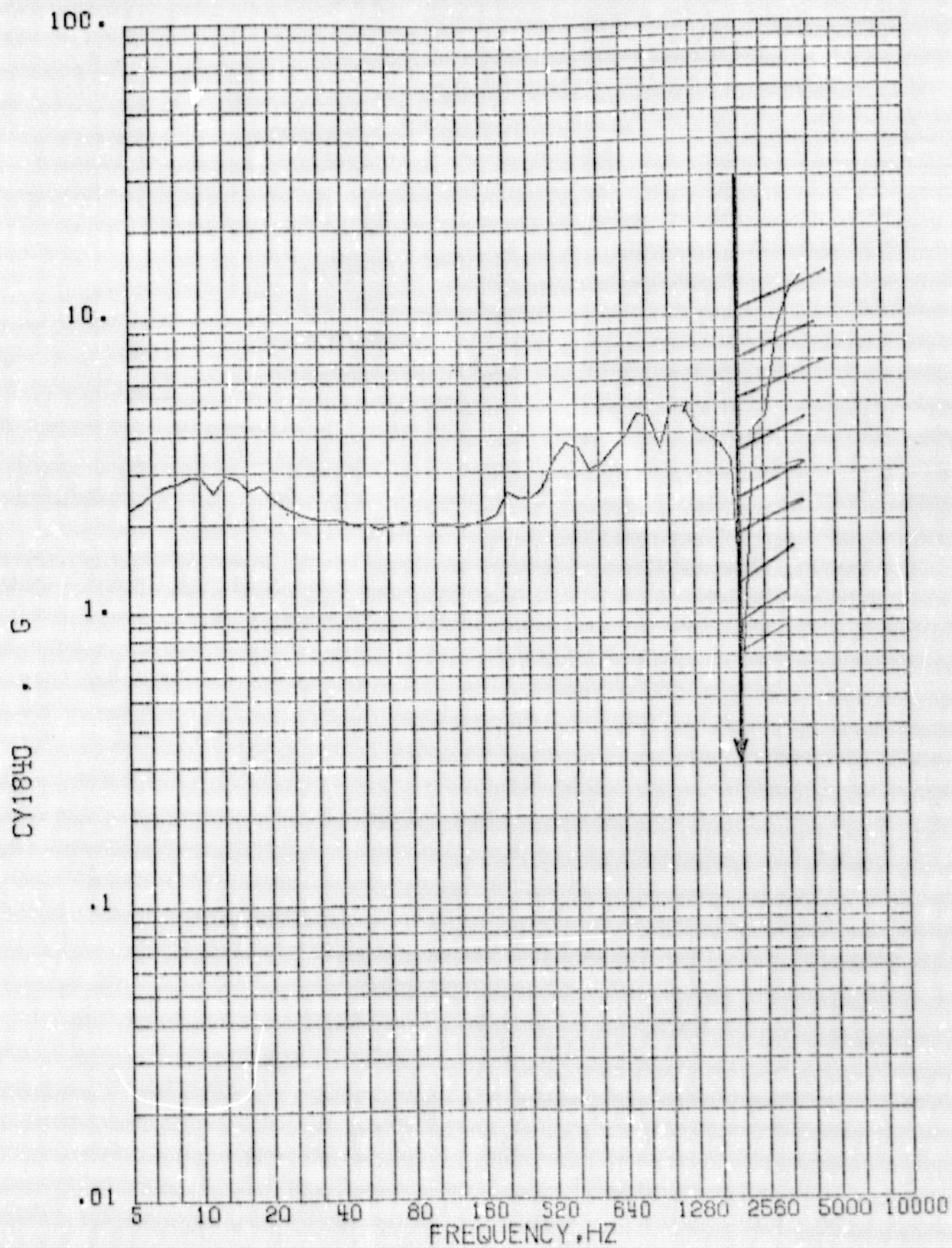
Figure 4.43b



4.44 9 4.90

Figure 4.44a

SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67403.0000SEC.

Q=10.

VIKING B

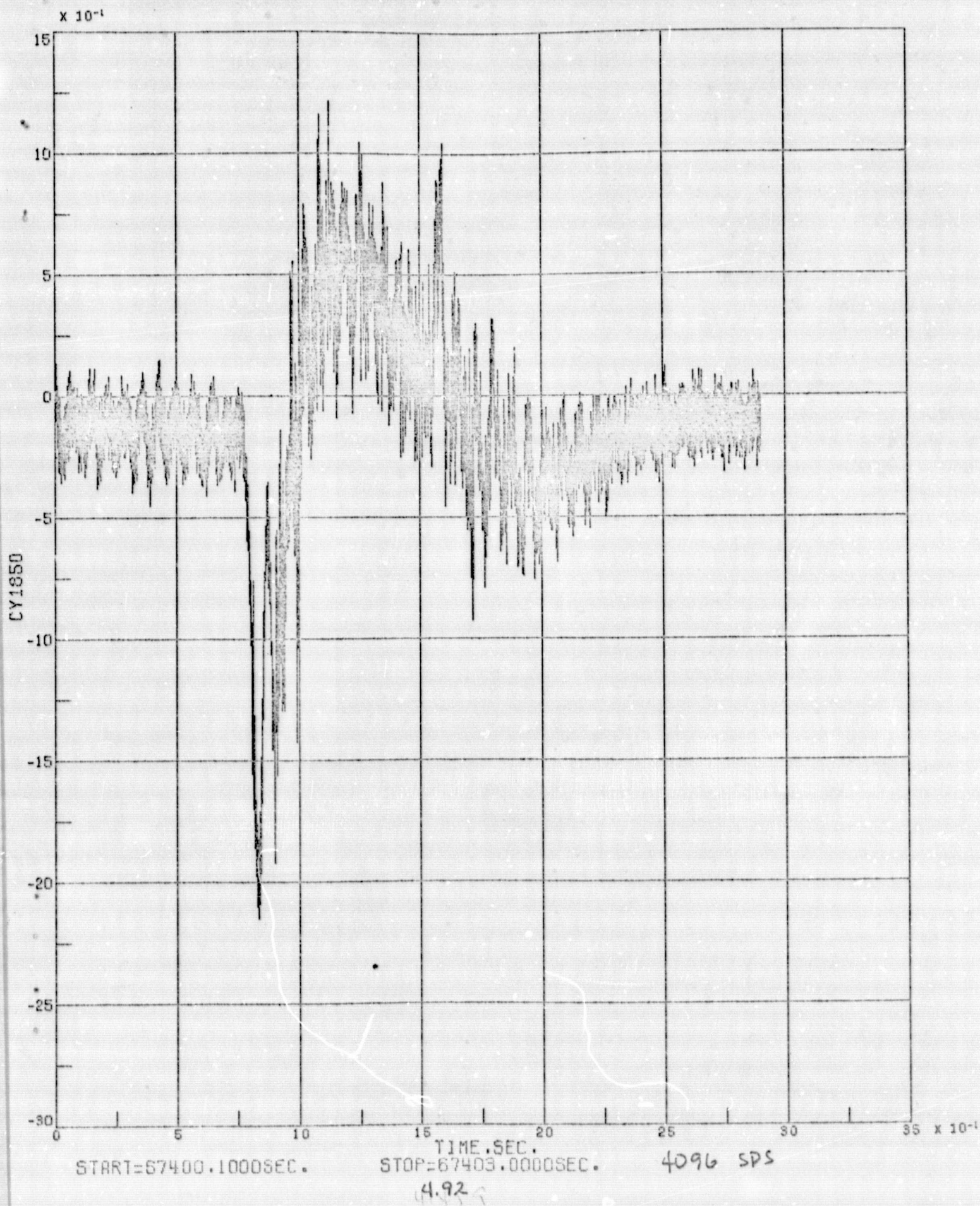
ST G 1 BO/STG 2 JGN(GBI)

S/ CY1840

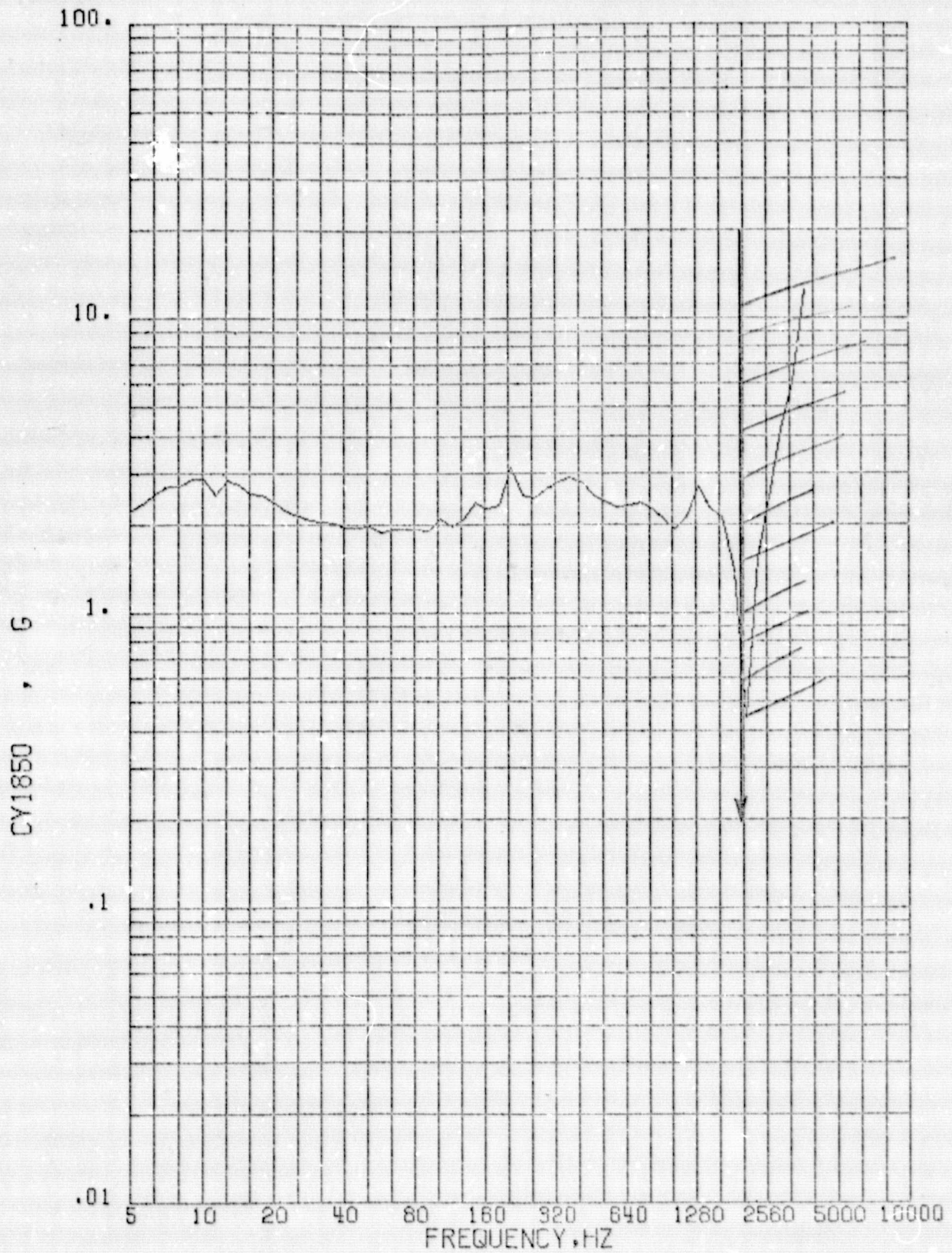
4096 SPS

4.11/4.91

Figure 4.44b



SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67403.0000SEC.

Q=10.

VIKING B

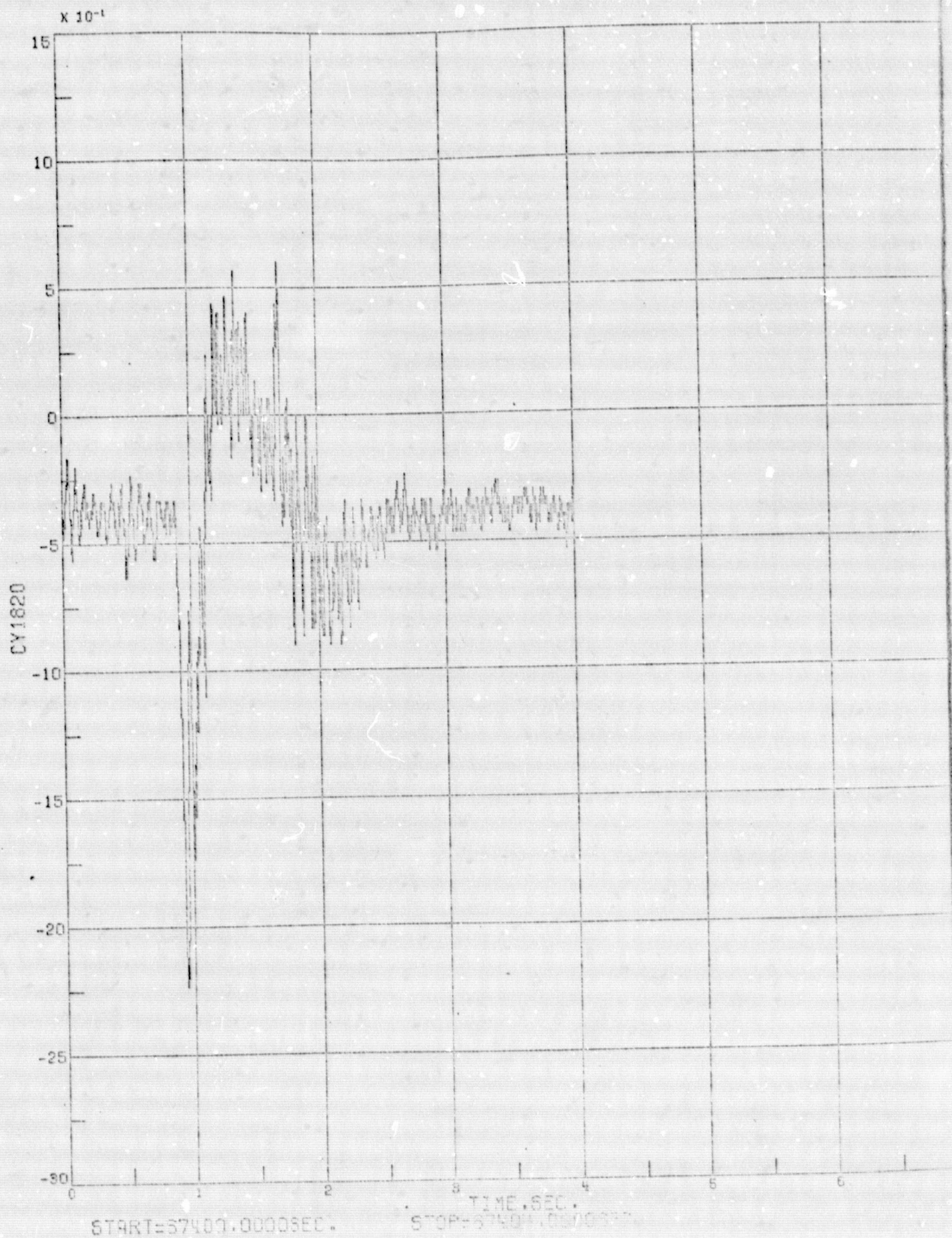
ST G 1 80/STG 2 IGN(GBI)

9/ CY1850

4096 SPS

4.93/5b

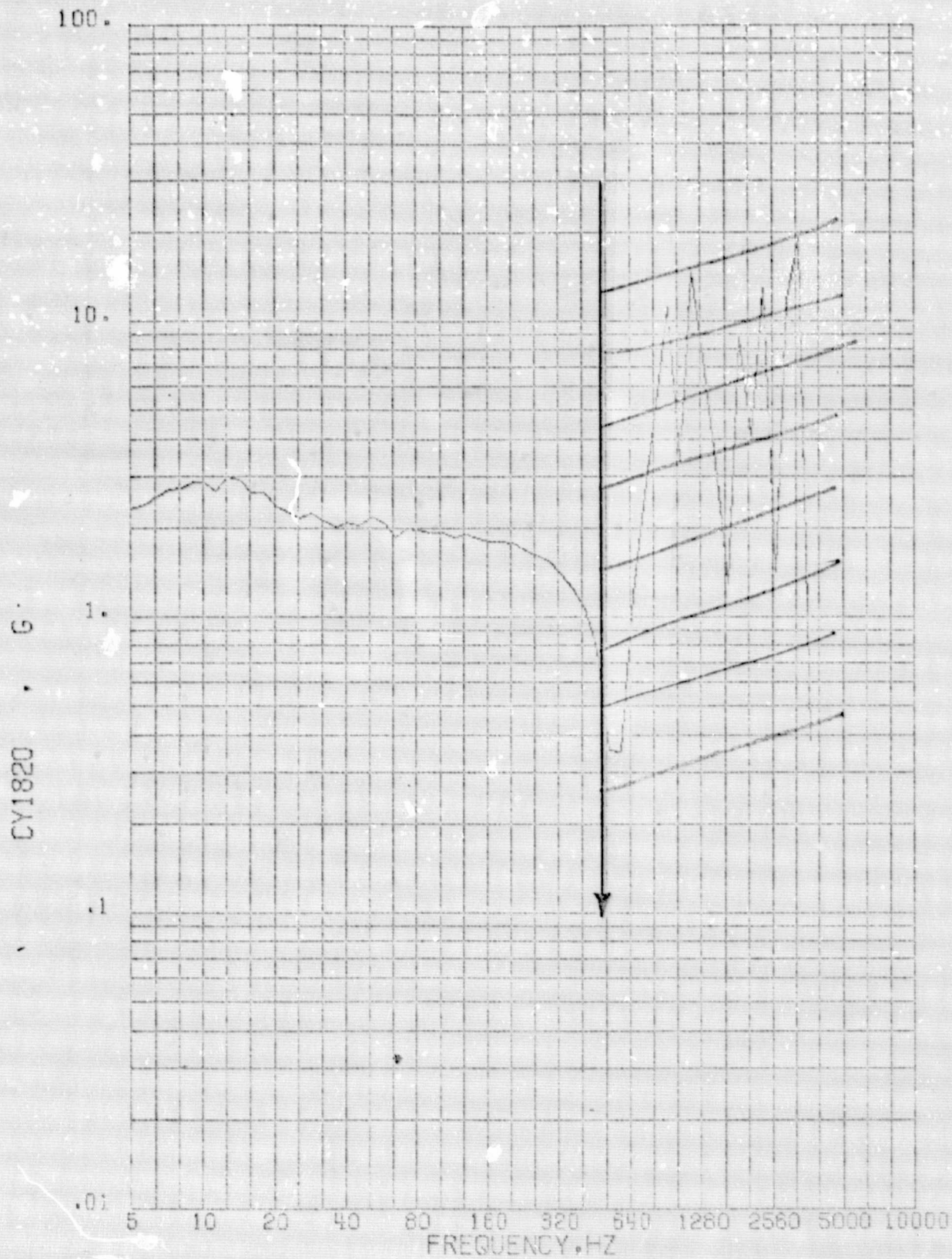
Figure 4.45b



49446a

Figure 4.46a

SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67404.0000SEC.

Q=10.

VIKING B

ST G 1 80/STG 2 16NOC311

1024

9/ CY1820

44.95

Figure 4.46b

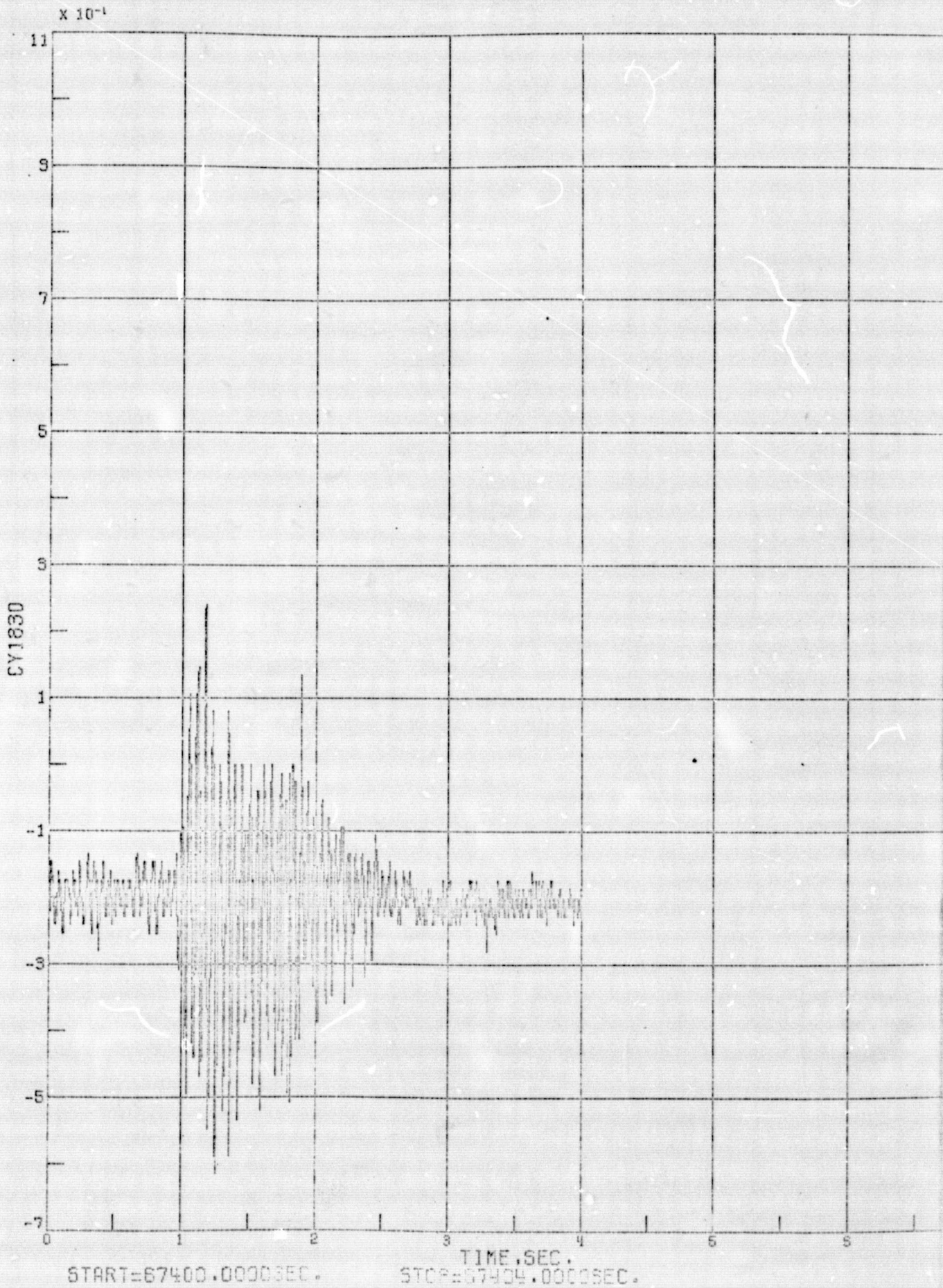
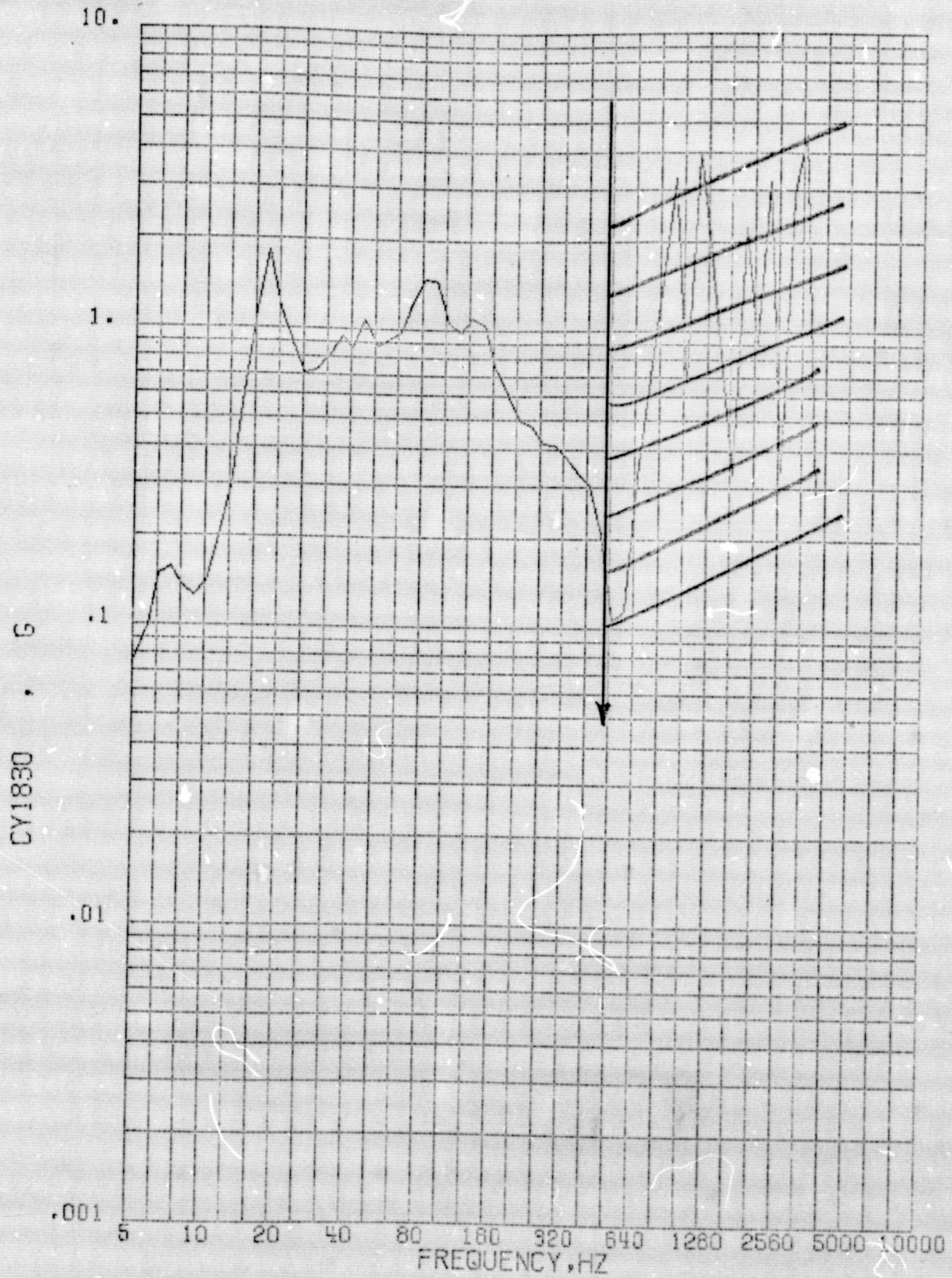


Figure 4.47a

SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67404.0000SEC.

Q=10.

VIKING B

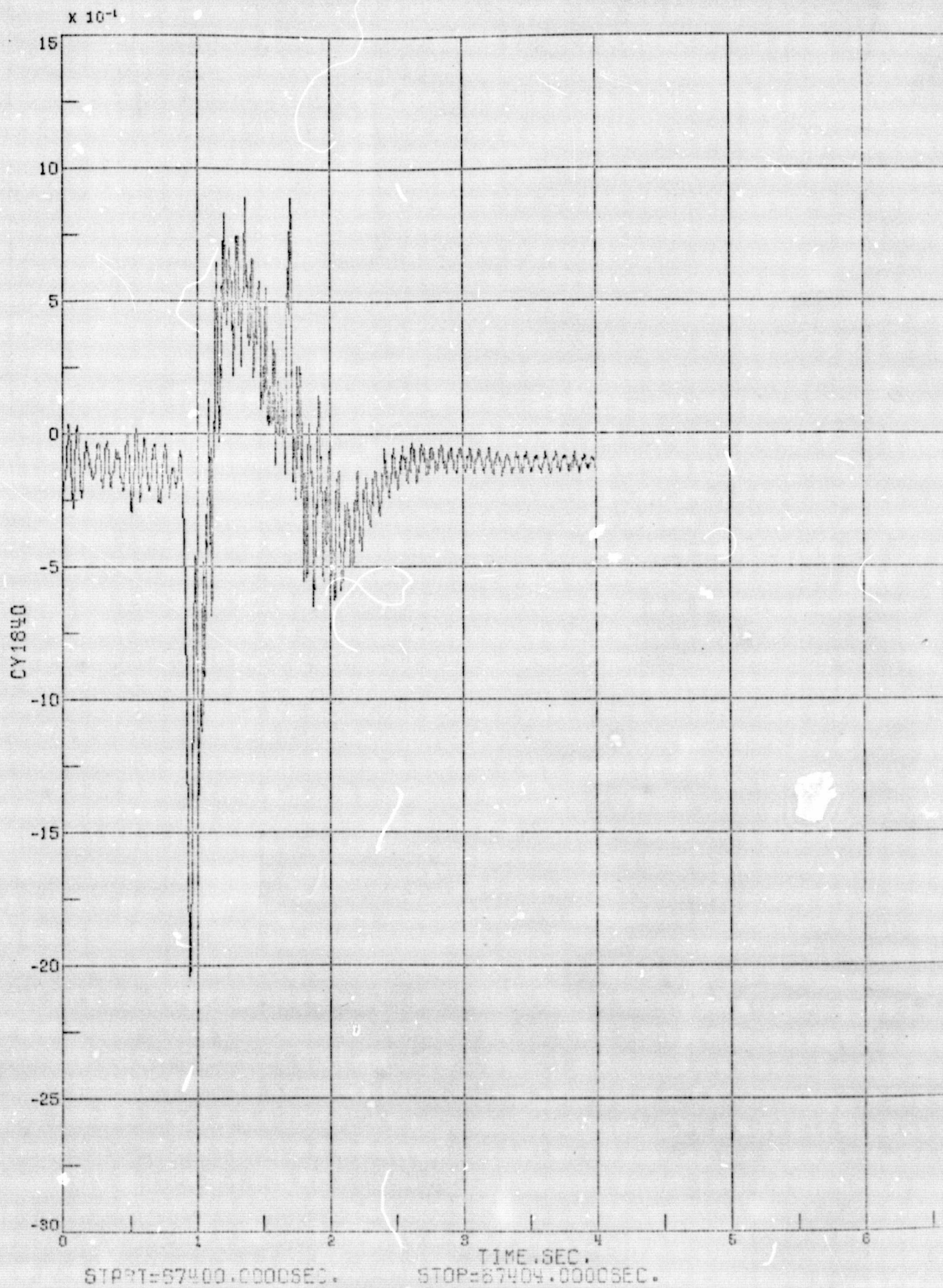
ST G 1 80/STG 2 16N(GBI)

9/ CY1830

4.97476

1024

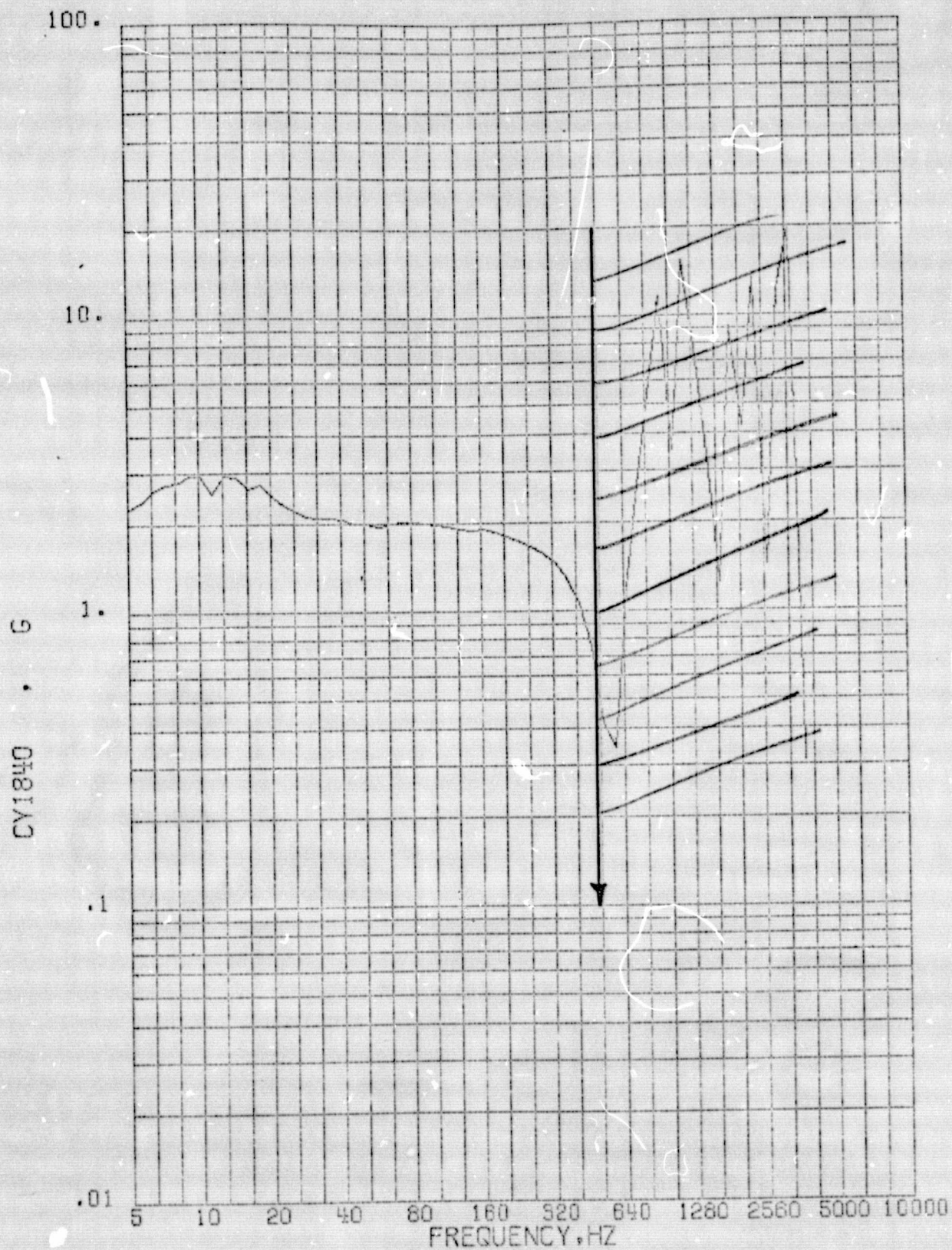
Figure 4.47b



4.98 9

Figure 4.48a

SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67404.0000SEC.

θ=10.

VIKING B

ST G 1 80/STG 2 IGN(G31)

9/ CY1840

4,499

1024

Figure 4.48b

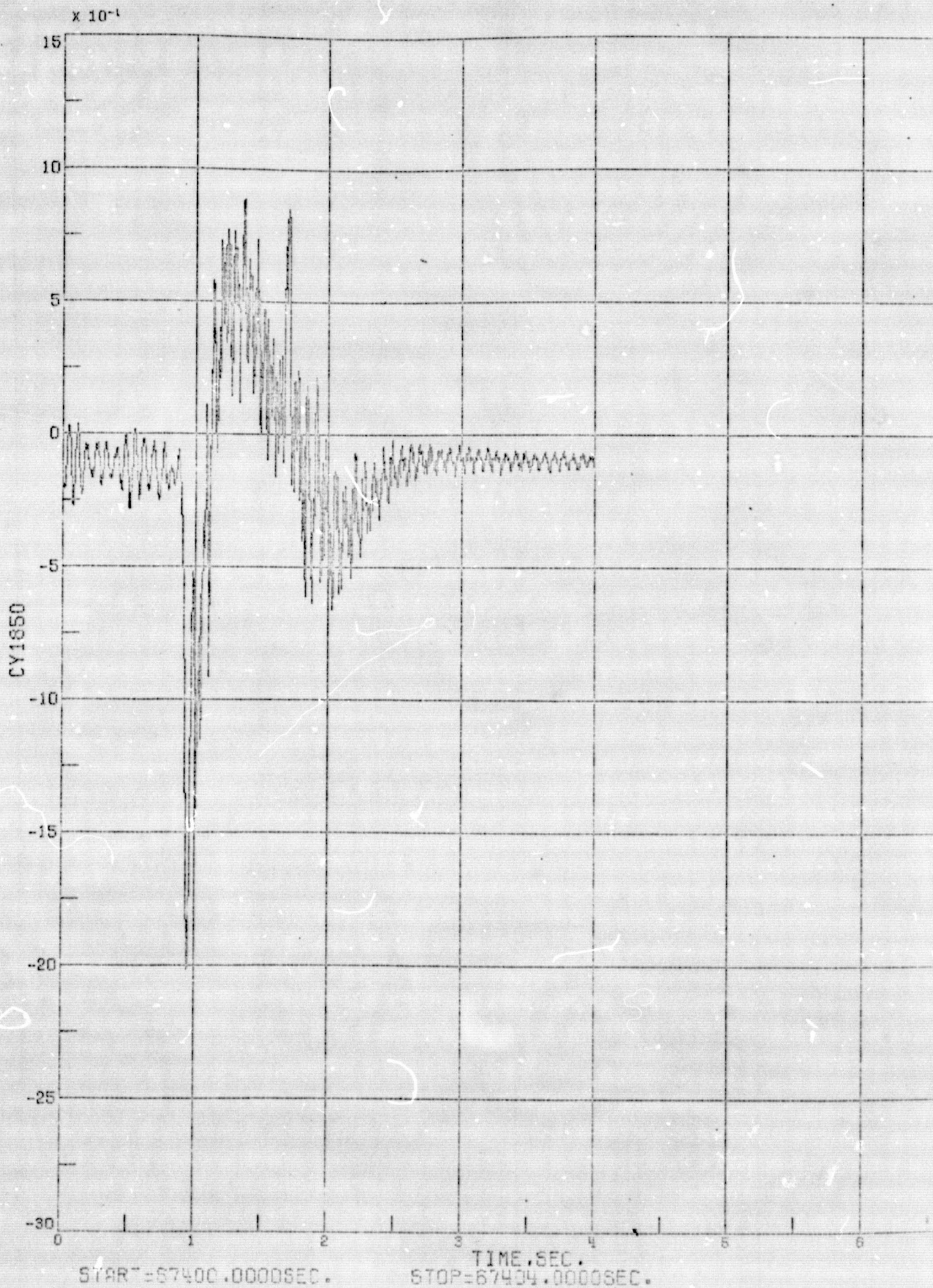
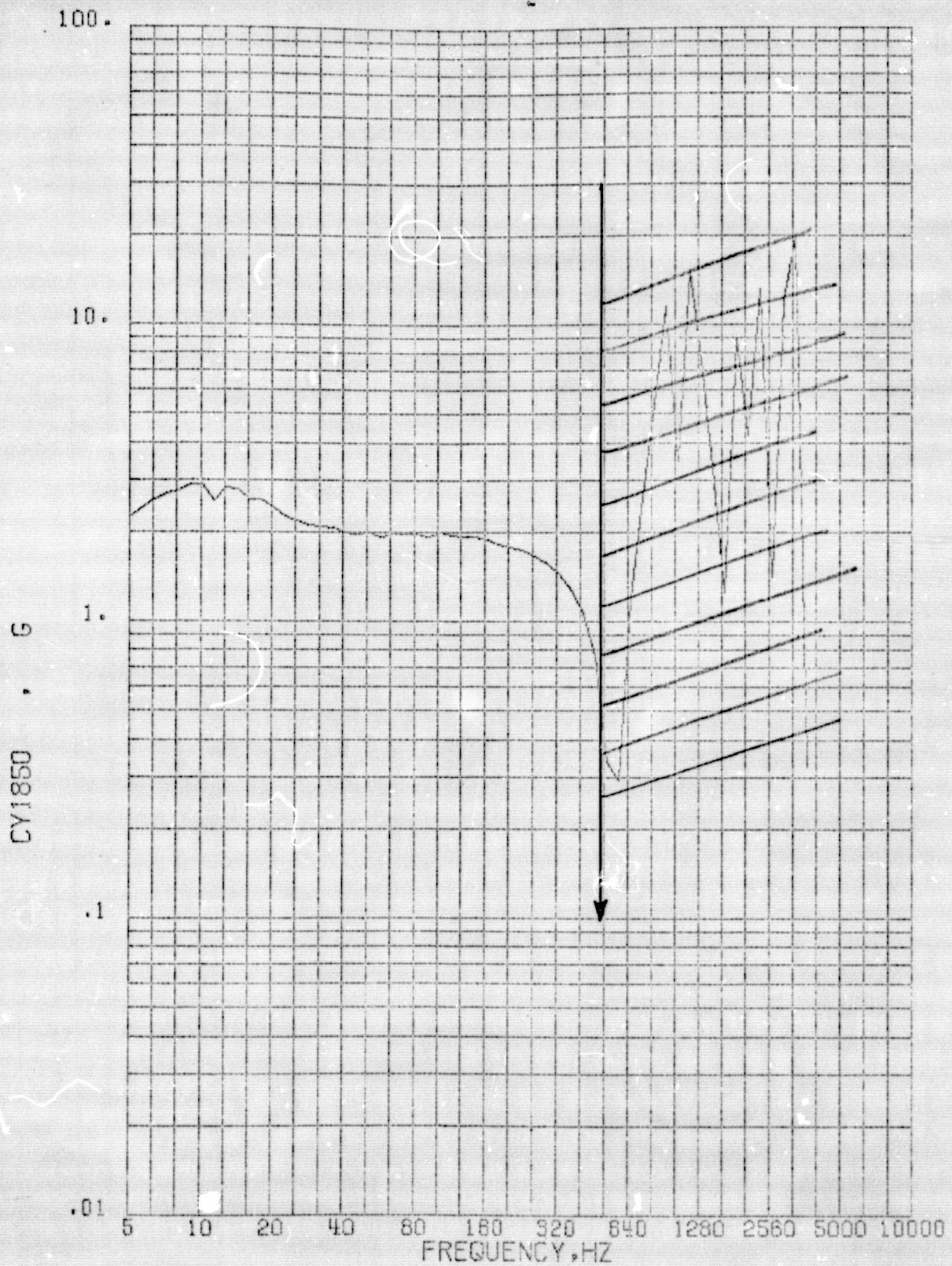


Figure 4. 49a

SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67404.0000SEC.

Q=10.

VIKING B

ST G 1 60/STG 2 IGN(GBI)

S/ CY1850

4.4.101

1024

Figure 4.49b

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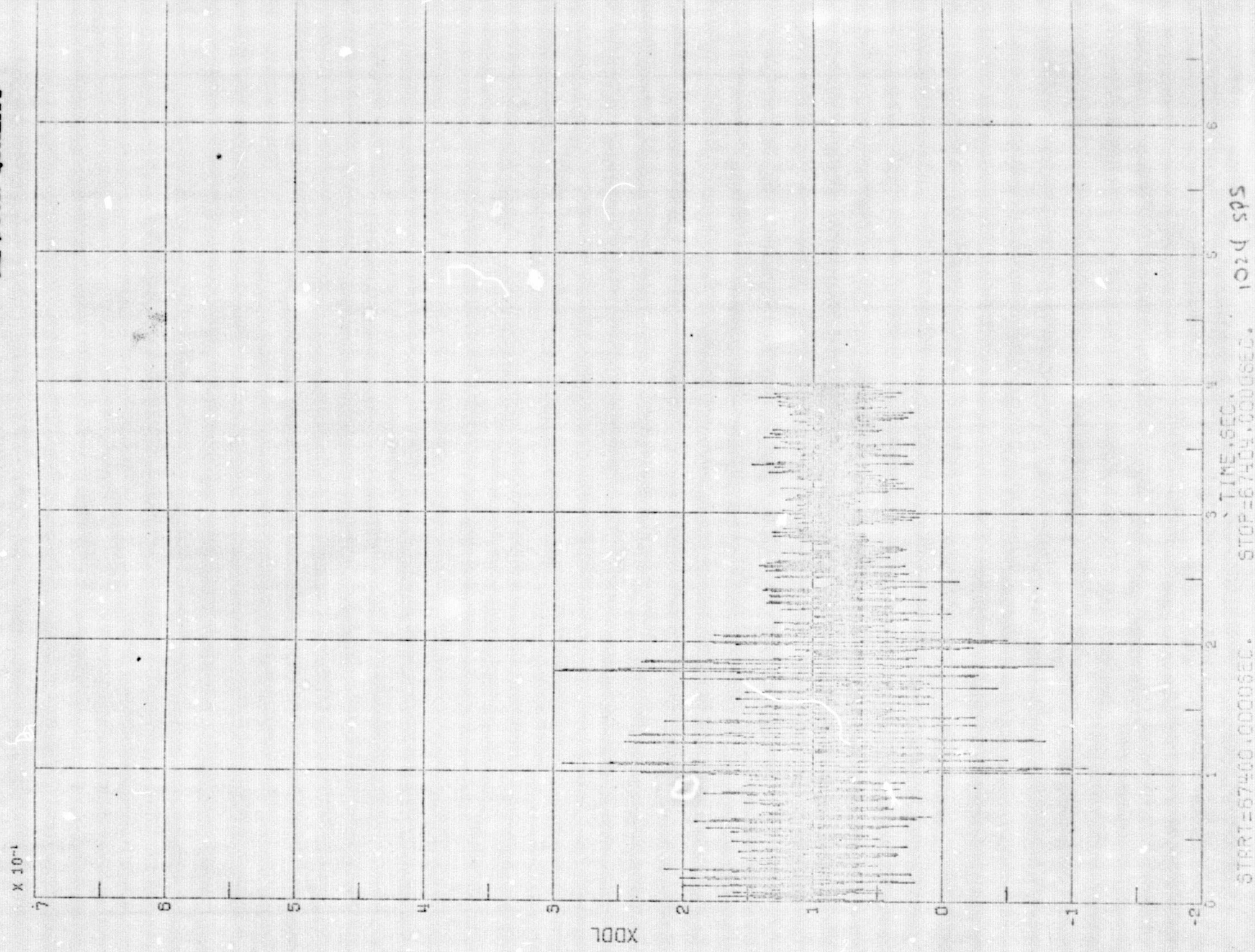
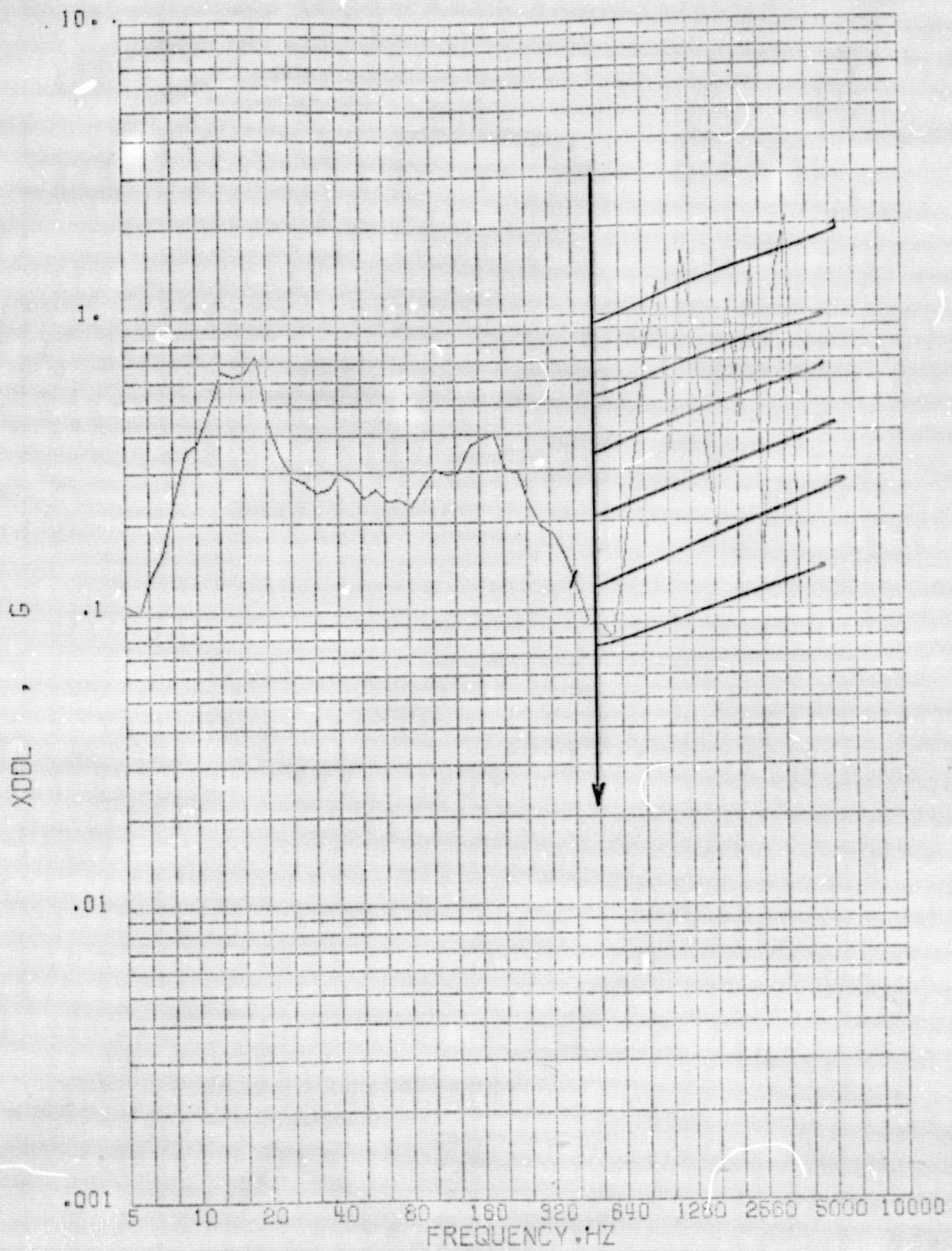


Figure 4.50a

SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67404.0000SEC.

Q=10.

VIKING B

ST G 1 80/SEC 2 16N(GBI)

9/

XDDL

1024 SPS

4.55/4.103

Figure 4.50b

ORIGINAL PAGE IS
OF POOR QUALITY

$\times 10^{-2}$

26

22

18

14

10

YDOL

6

2

-2

-6

-10

TIME, SEC.

STOP=67401.0000SEC.

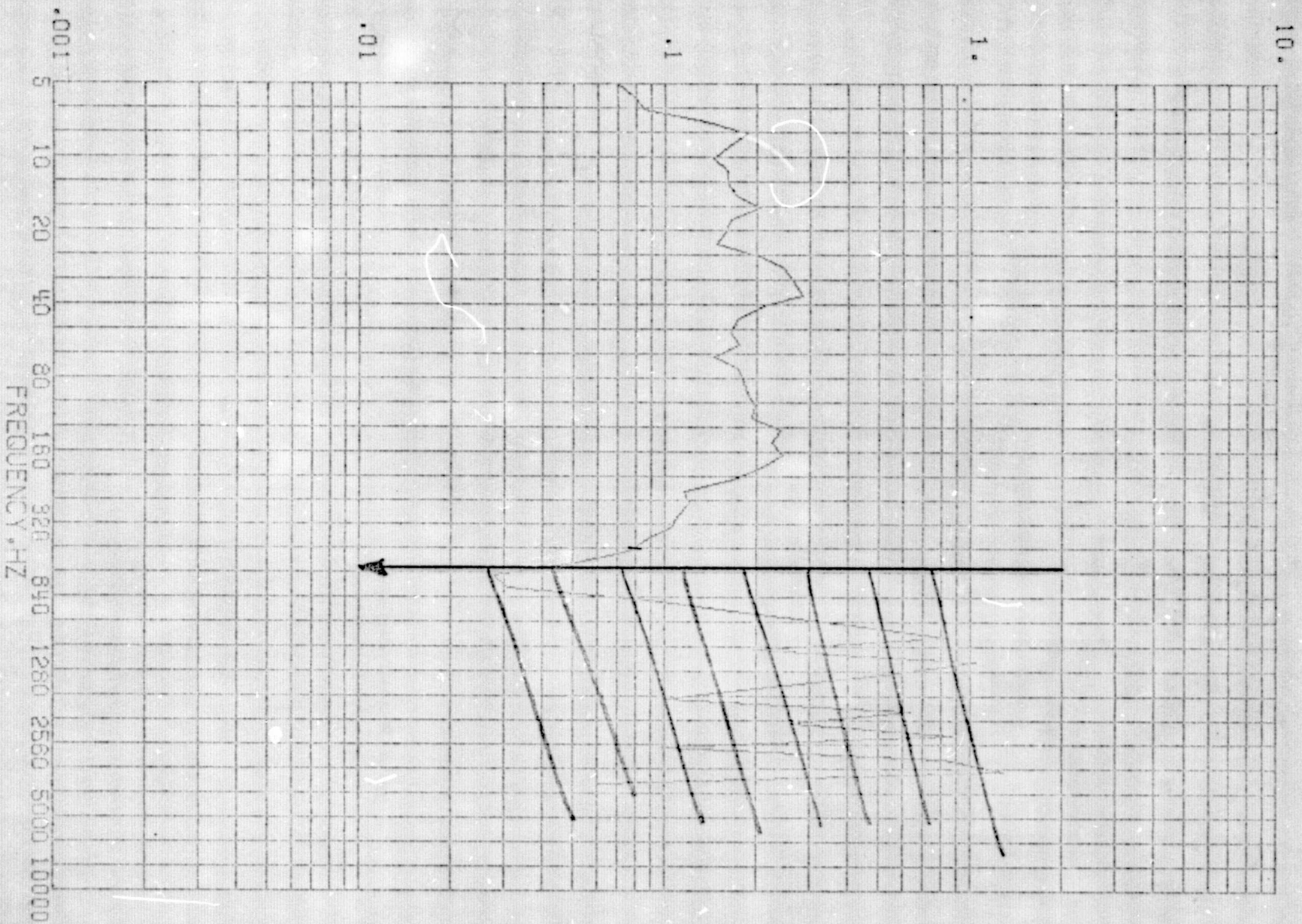
1024 SPS

START=67400.0000SEC.

4.54104

Figure 4.51a

SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67404.0000SEC.

Q=10.

VIKING 6

ST 6 1 80/STG 2 IGN(GBI)

5/ YDDL

1024 cps

4,54,105

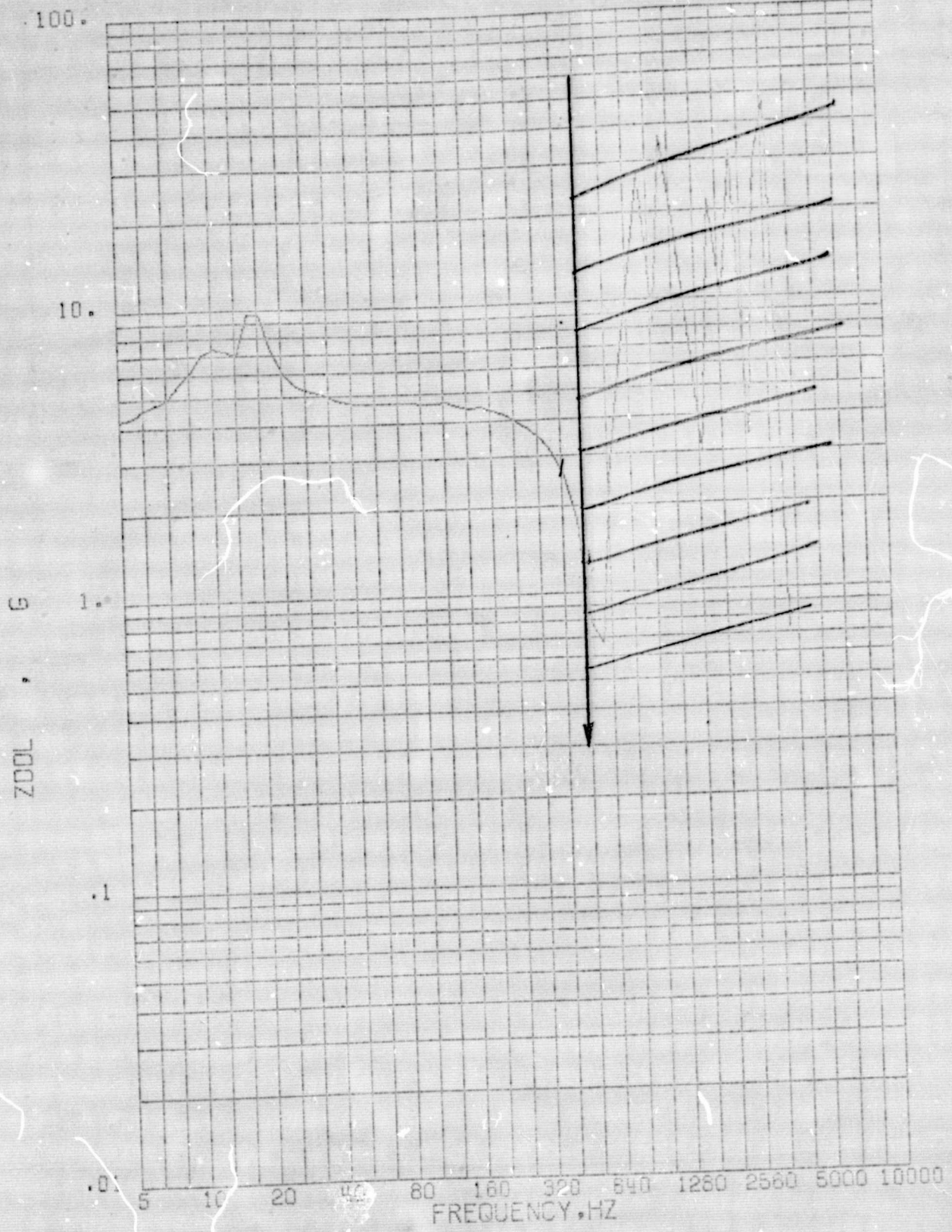
Figure 4.51b

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OF POOR QUALITY



Figure 4.52a

SHOCK SPECTRUM



START=67400.6000SEC. STOP=67404.0000SEC. Q=10.
 VIKING B ST G 1 80/STG 2 1GN(GBI) 9/ ZDDL
 1024 SPS

4.107

Figure 4.52b

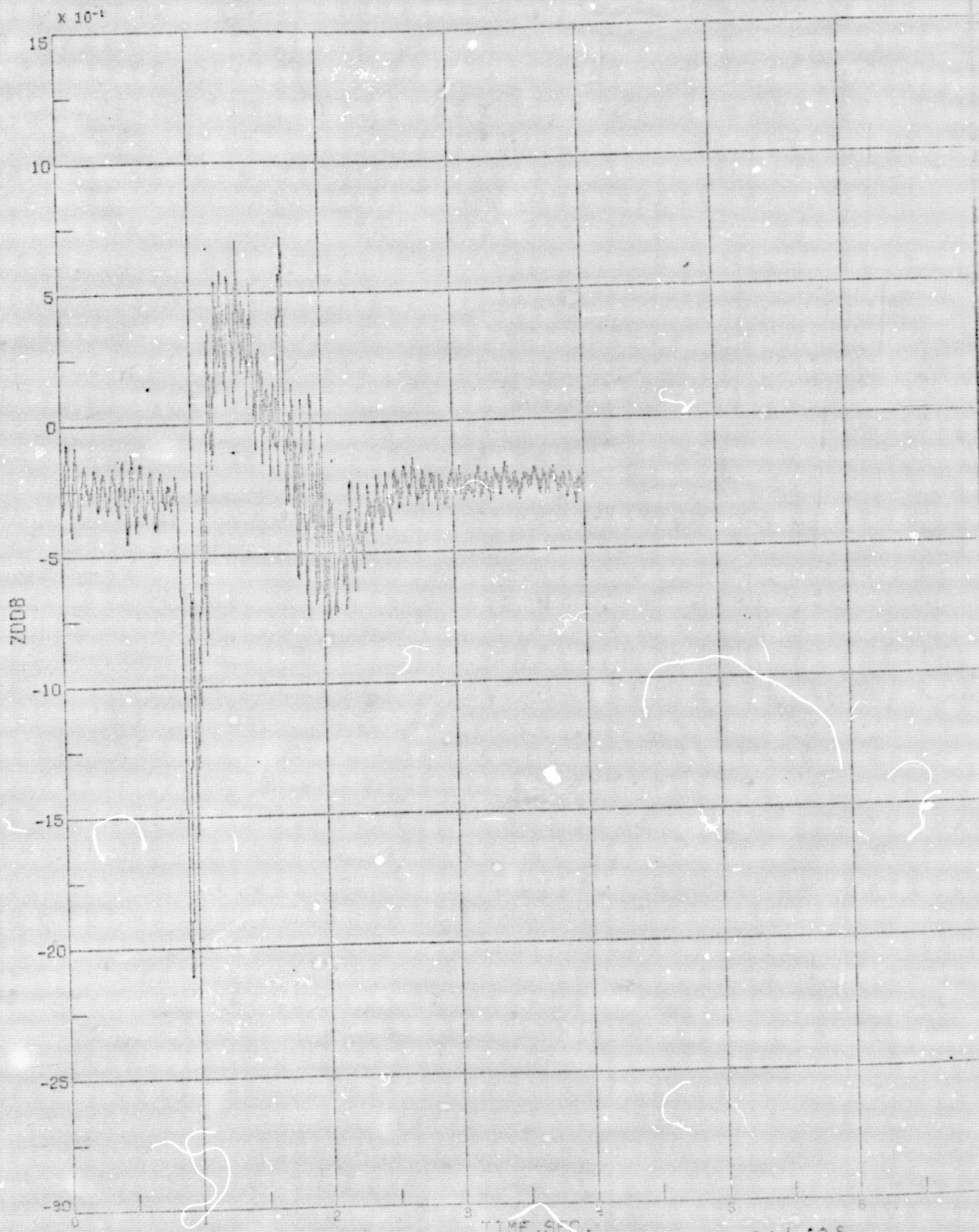
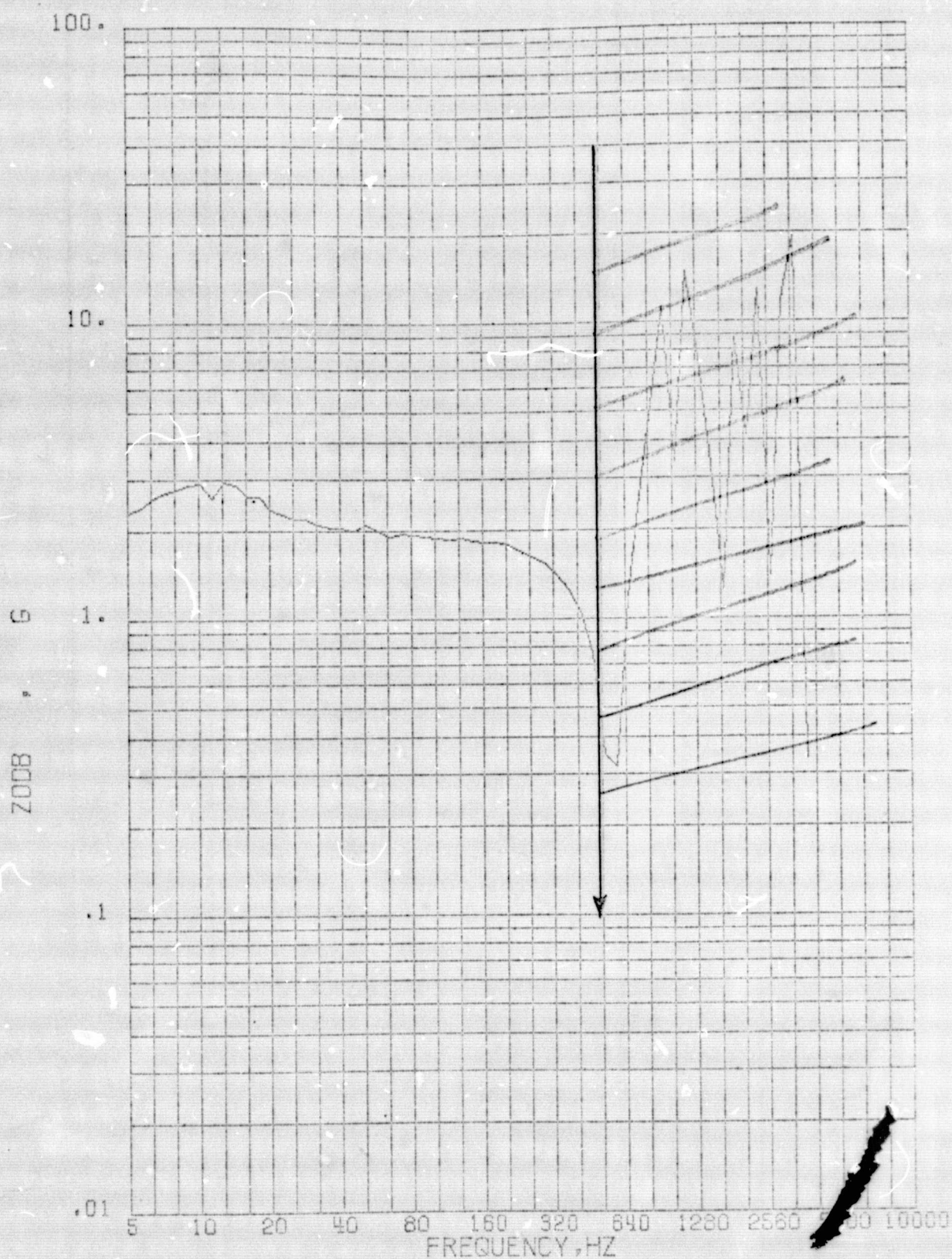


Figure 4.53a

SHOCK SPECTRUM



START=67400.6000SEC.

STOP=67404.0000SEC.

Q=10.

VIKING B

ST G 1 80/STG 2 16N(GBI)

9/

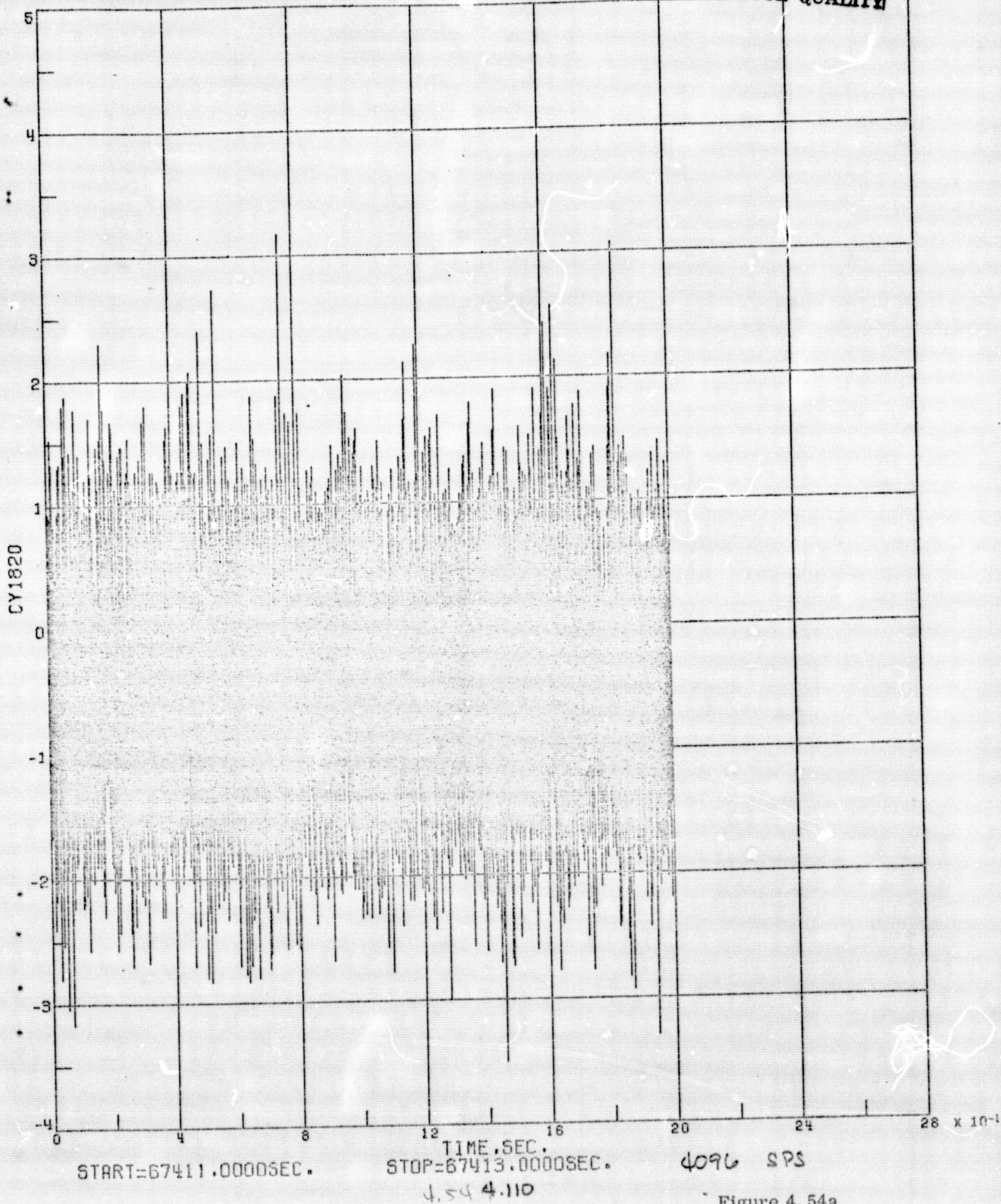
Z008

1024 SPS

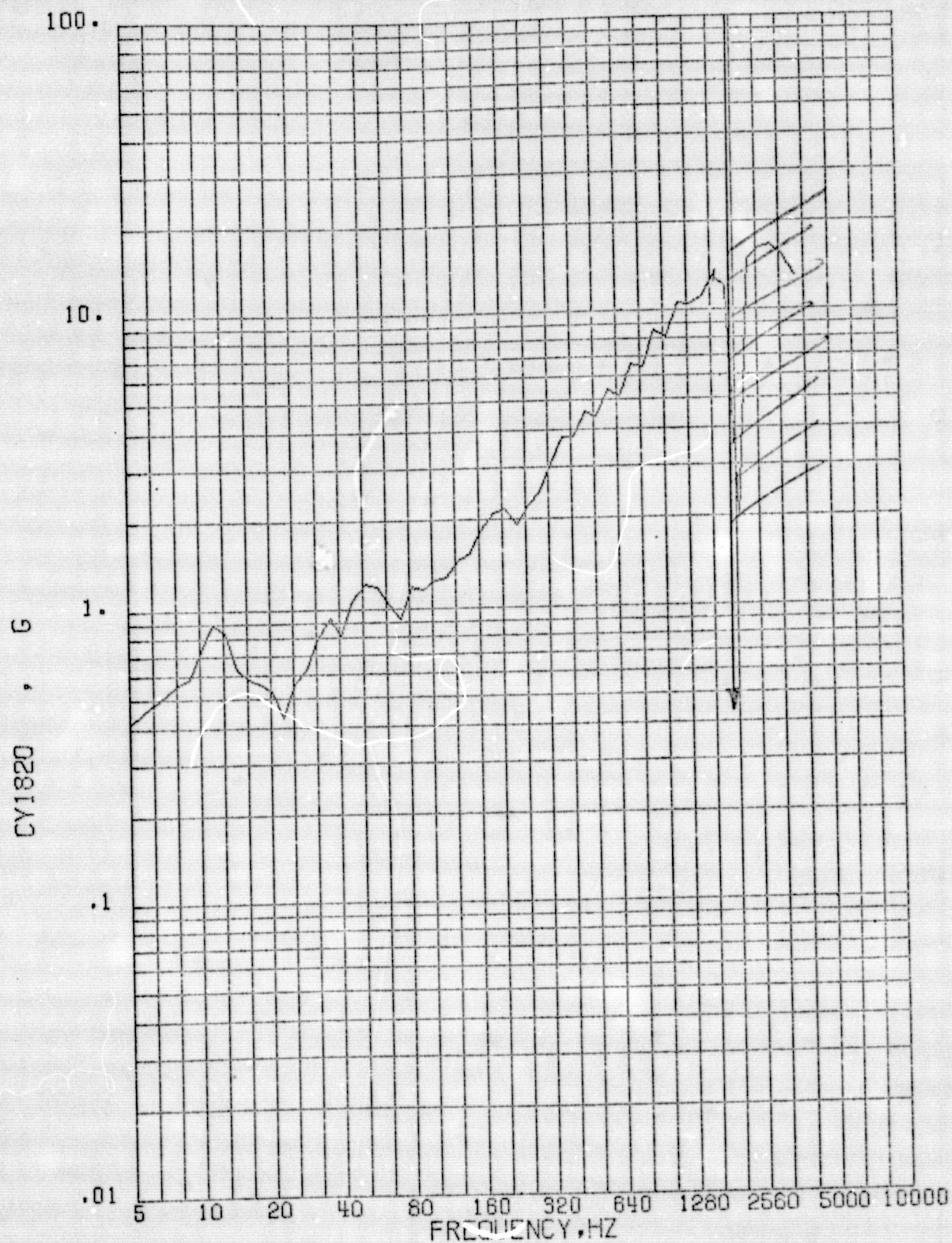
4.55-4.109

Figure 4. 53b

ORIGINAL PAGE IS
OF POOR QUALITY



SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67413.0000SEC.

Q=10.

VIKING B

JE TT SHROUD (G81)

9/ CY1820

4096 SPS

4.111

Figure 4.54b

ORIGINAL PAGE IS
OF POOR QUALITY

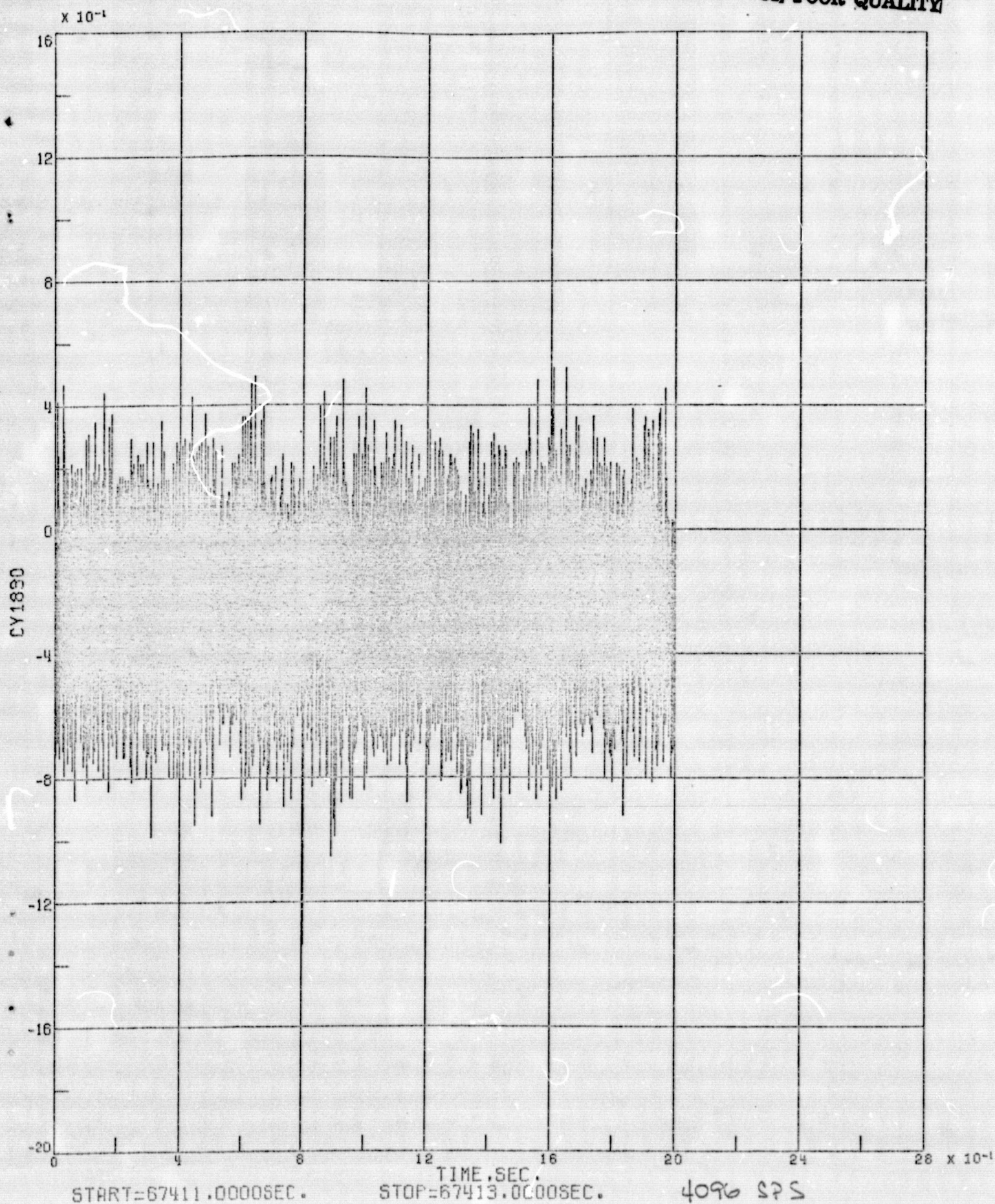
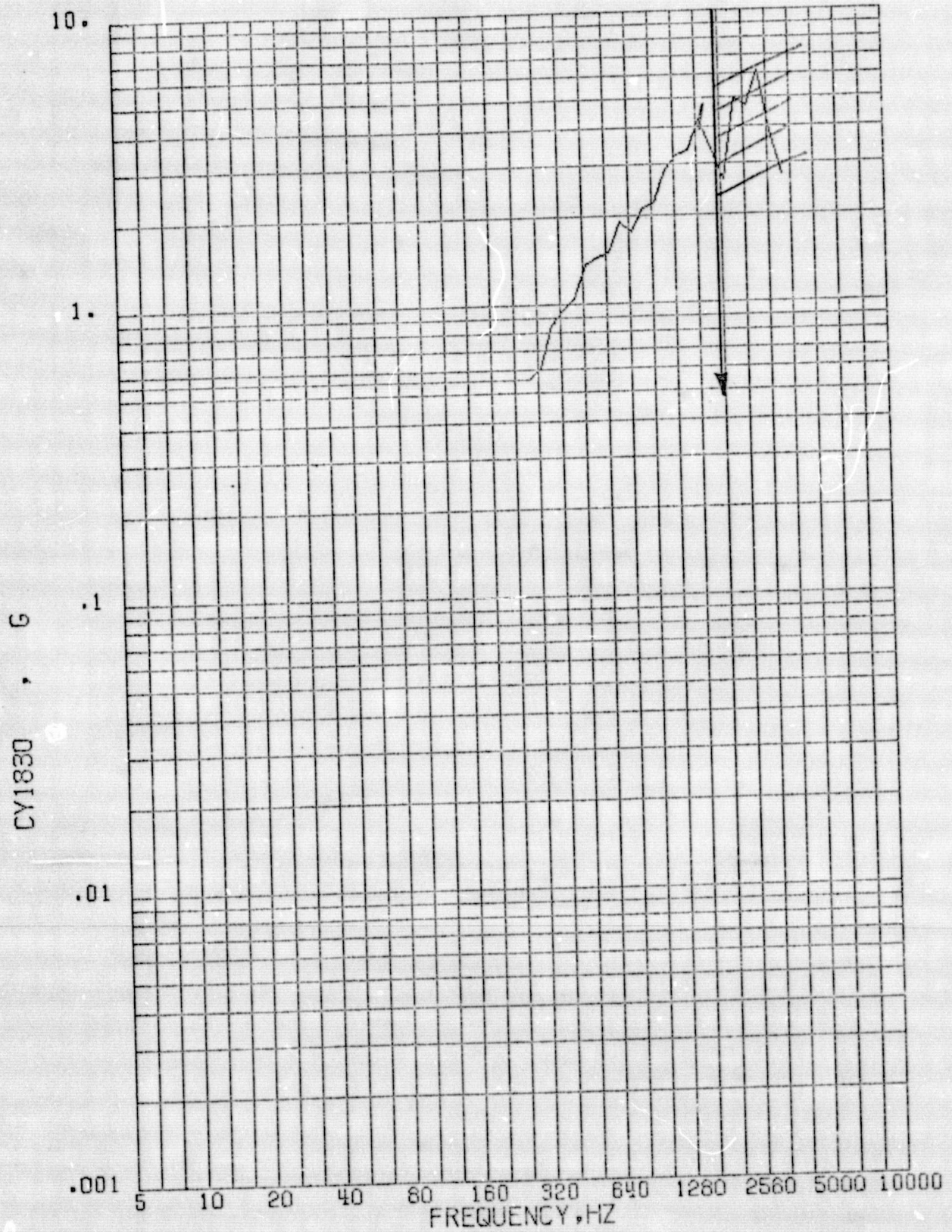


Figure 4.55a

SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67413.0000SEC.

Q=10.

VIKING B

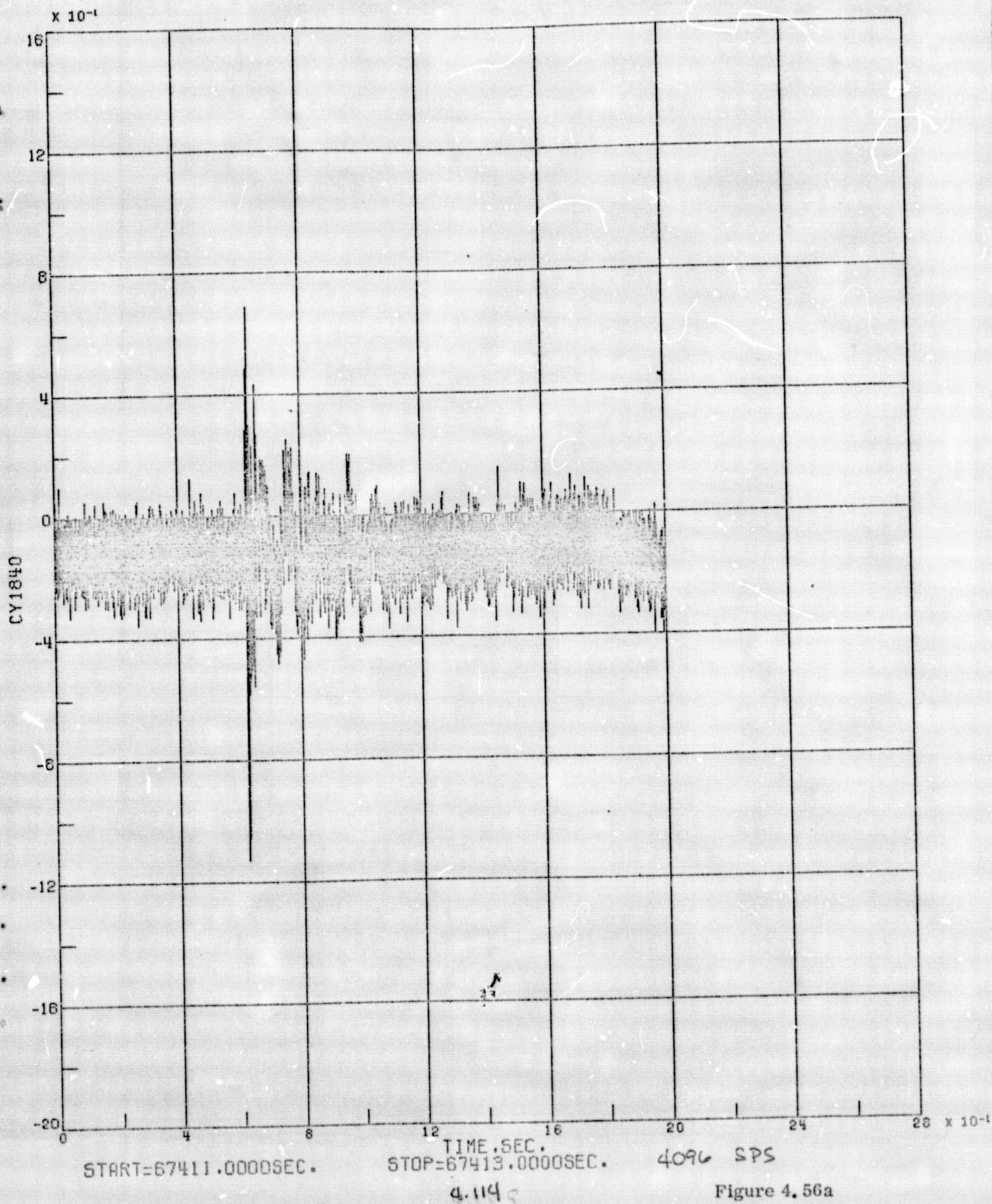
JE TT SHROUD (GB1)

9/ CY1830

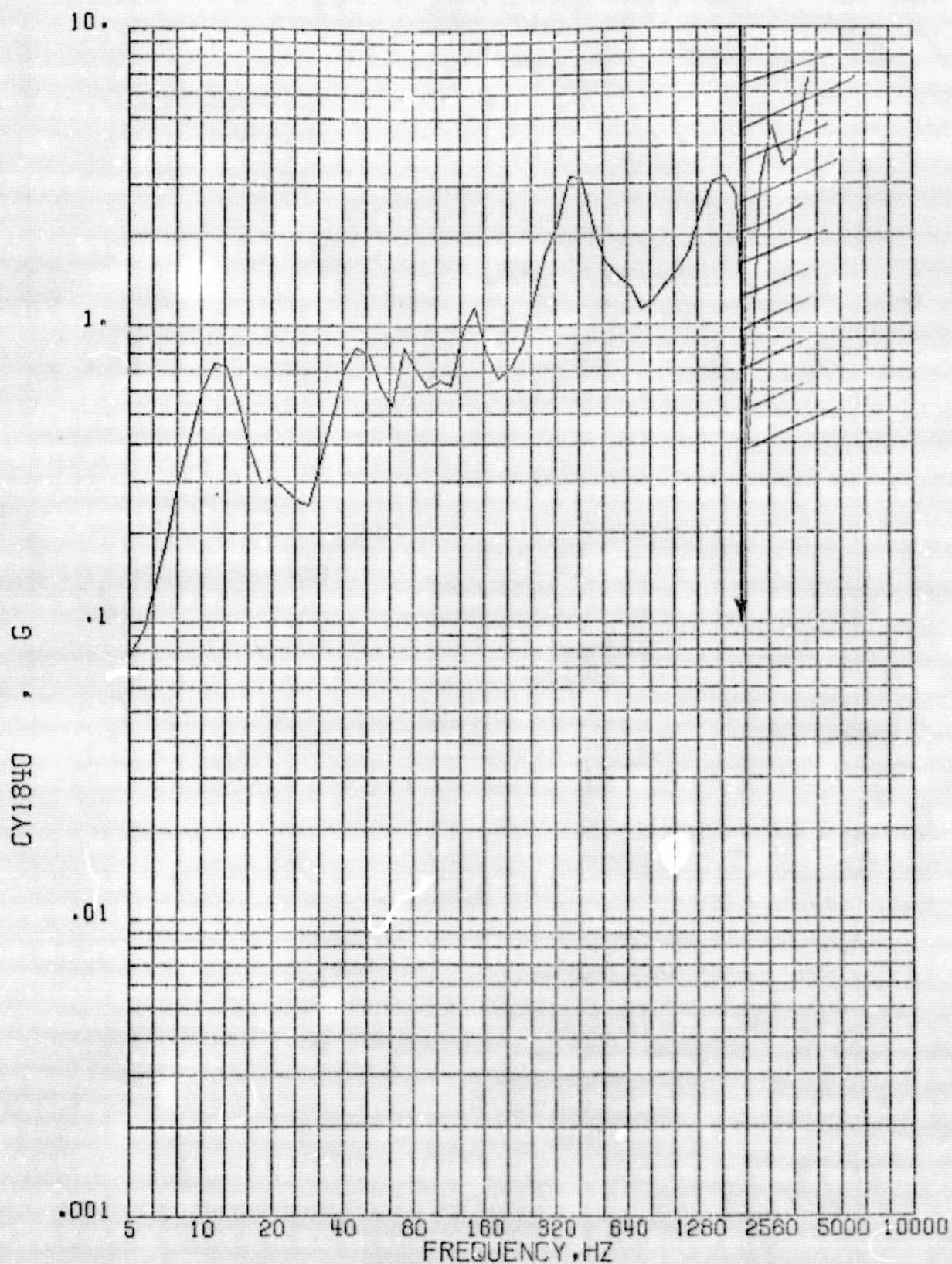
4096 SPS

4.113

Figure 4.55b



SHOCK SPECTRUM



START=67411.6000SEC. STOP=67413.0000SEC. Q=10.

VIKING B

JE TT SHROUD (GBI)

9/ CY1840

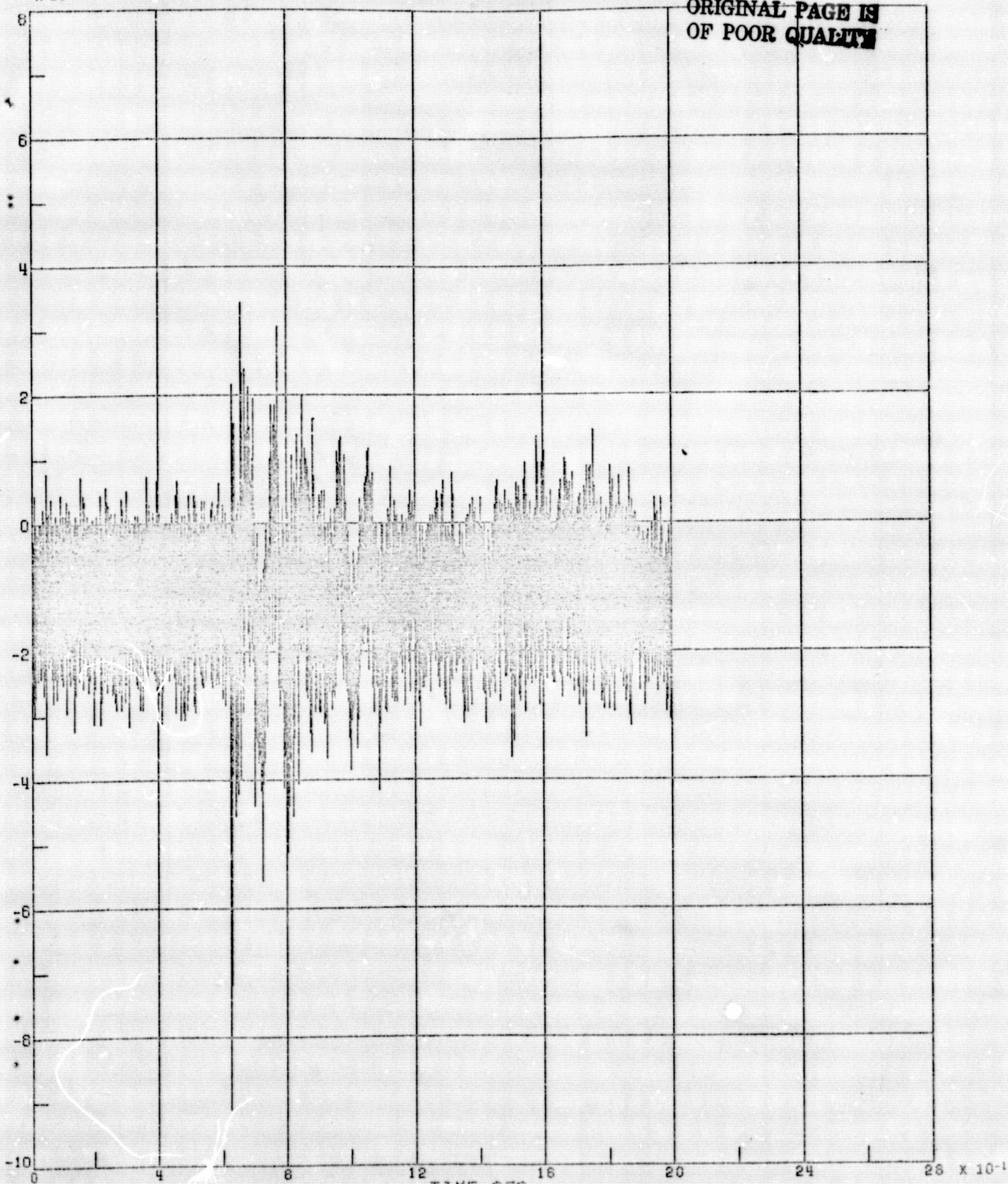
4096 SPS

4.115

Figure 4.56b

$\times 10^{-1}$

ORIGINAL PAGE IS
OF POOR QUALITY



START=67411.0000SEC.

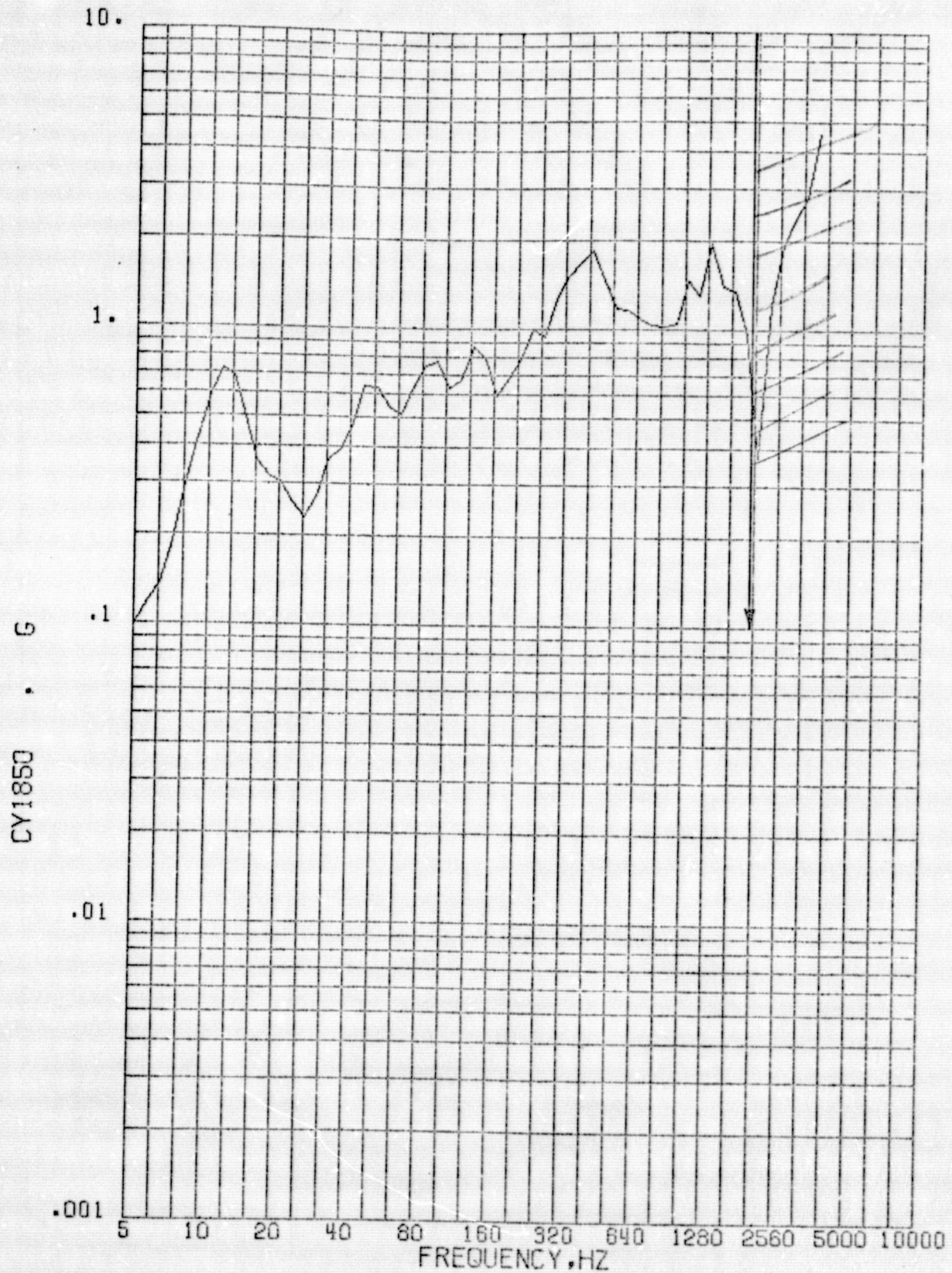
STOP=67413.0000SEC.

4096 SPS

4.116
6.575

Figure 4.57a

SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67413.0000SEC.

Q=10.

VIKING B

JE TT SHROUD (GB1)

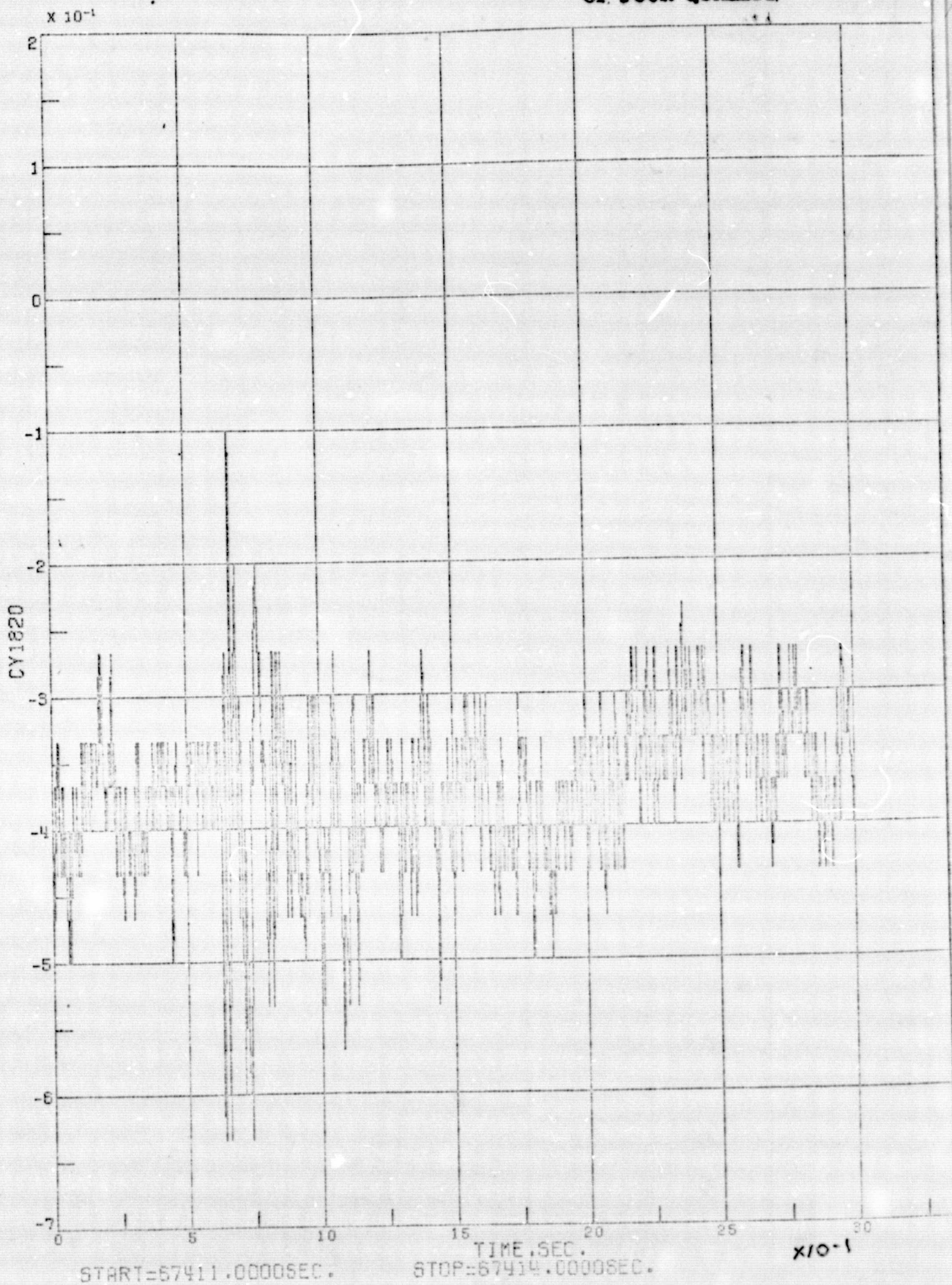
9/ CY1850

4096 SPS

4.117

Figure 4.57b

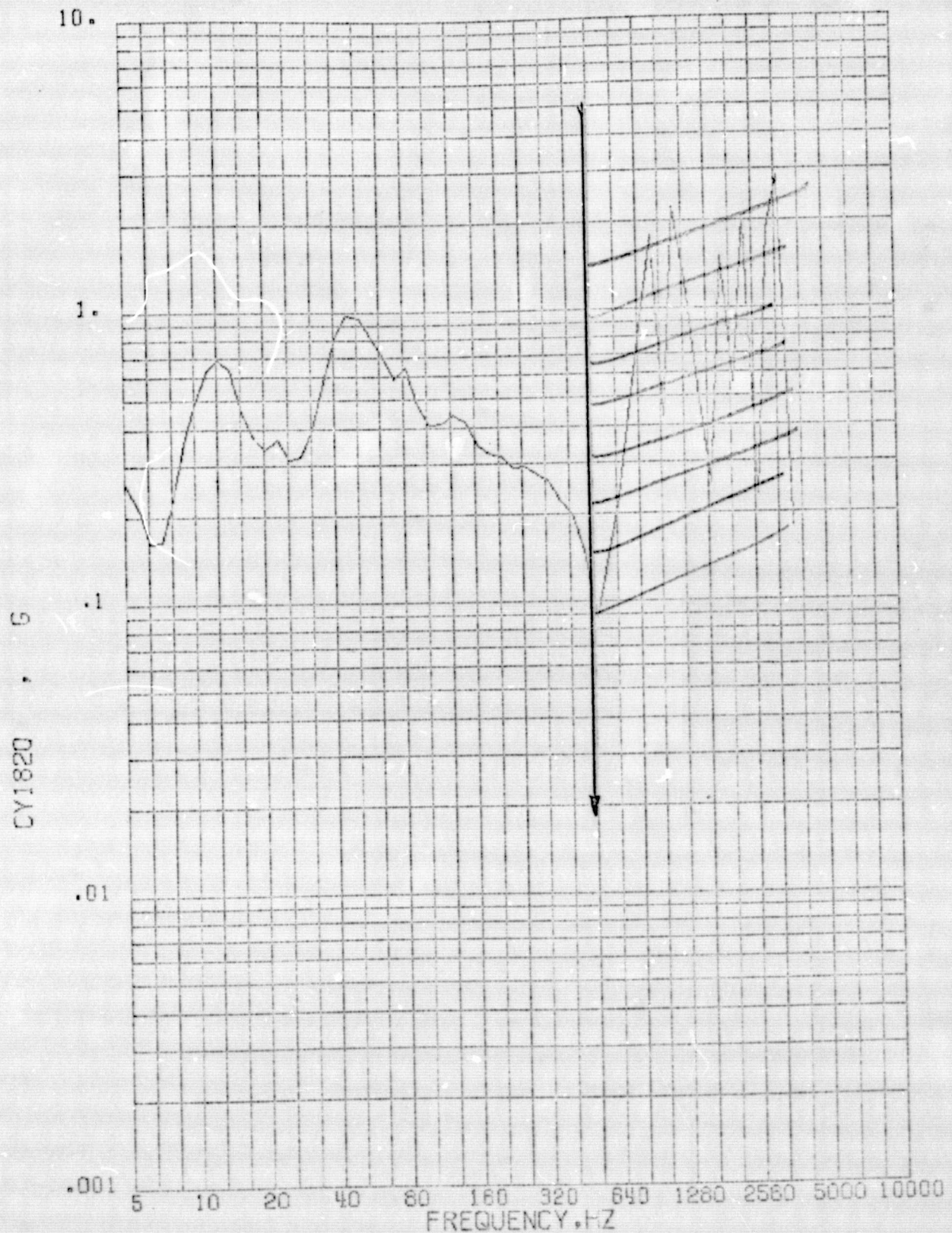
ORIGINAL PAGE IS
OF POOR QUALITY



44,189

Figure 4. 58a

SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67414.0000SEC.

Q=10.

VIKING B

JE TT SHROUD(GBI) 1024

9/ CY1820

4.119
4.53 b

Figure 4.58b

$\times 10^{-2}$

CY1830

-40

5

START=67411.0000SEC.

4120

10

15

20

25

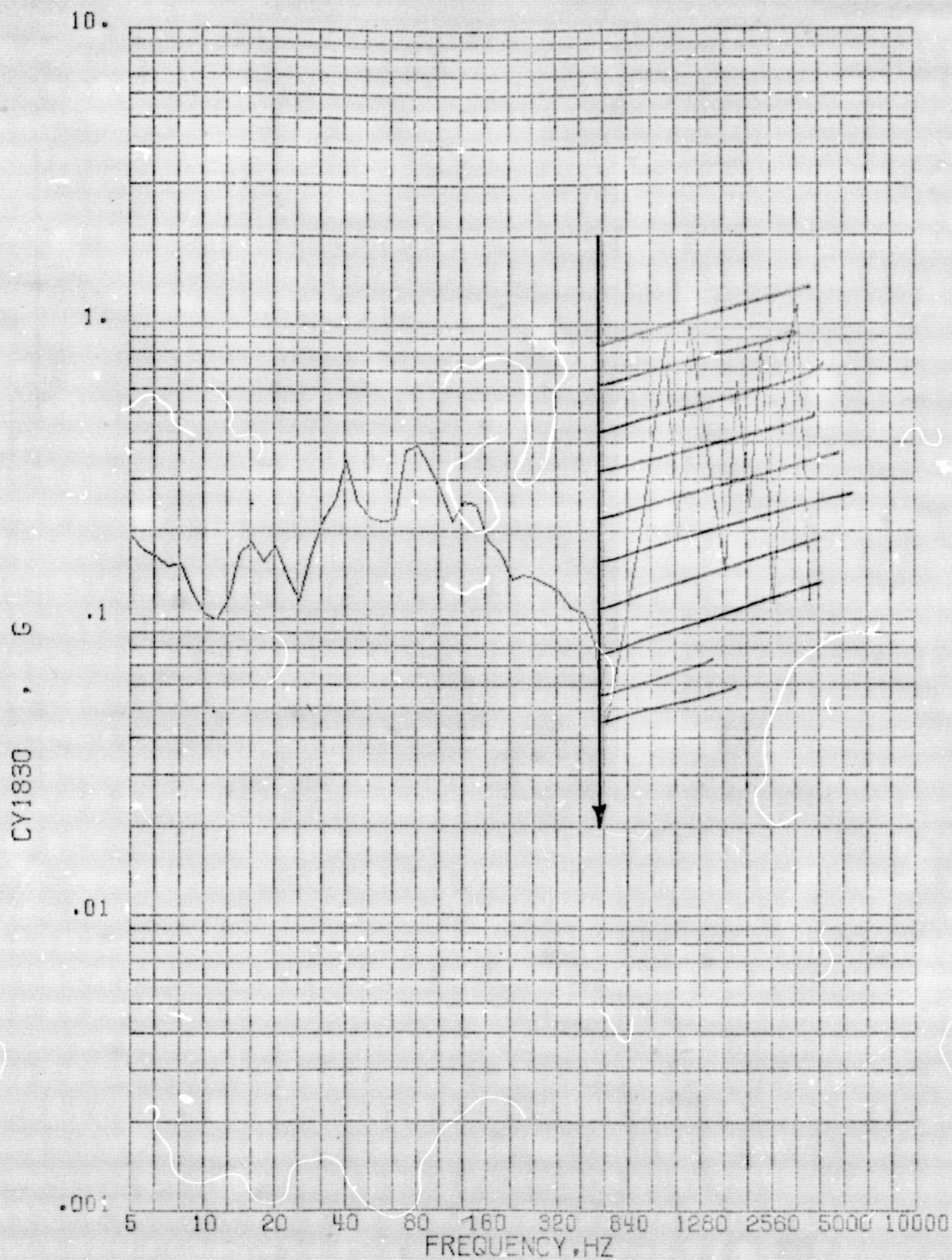
30

TIME, SEC.
STOP=67414.0000SEC.

$\times 10^{-1}$

Figure 4.59a

SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67414.0000SEC.

Q=10.

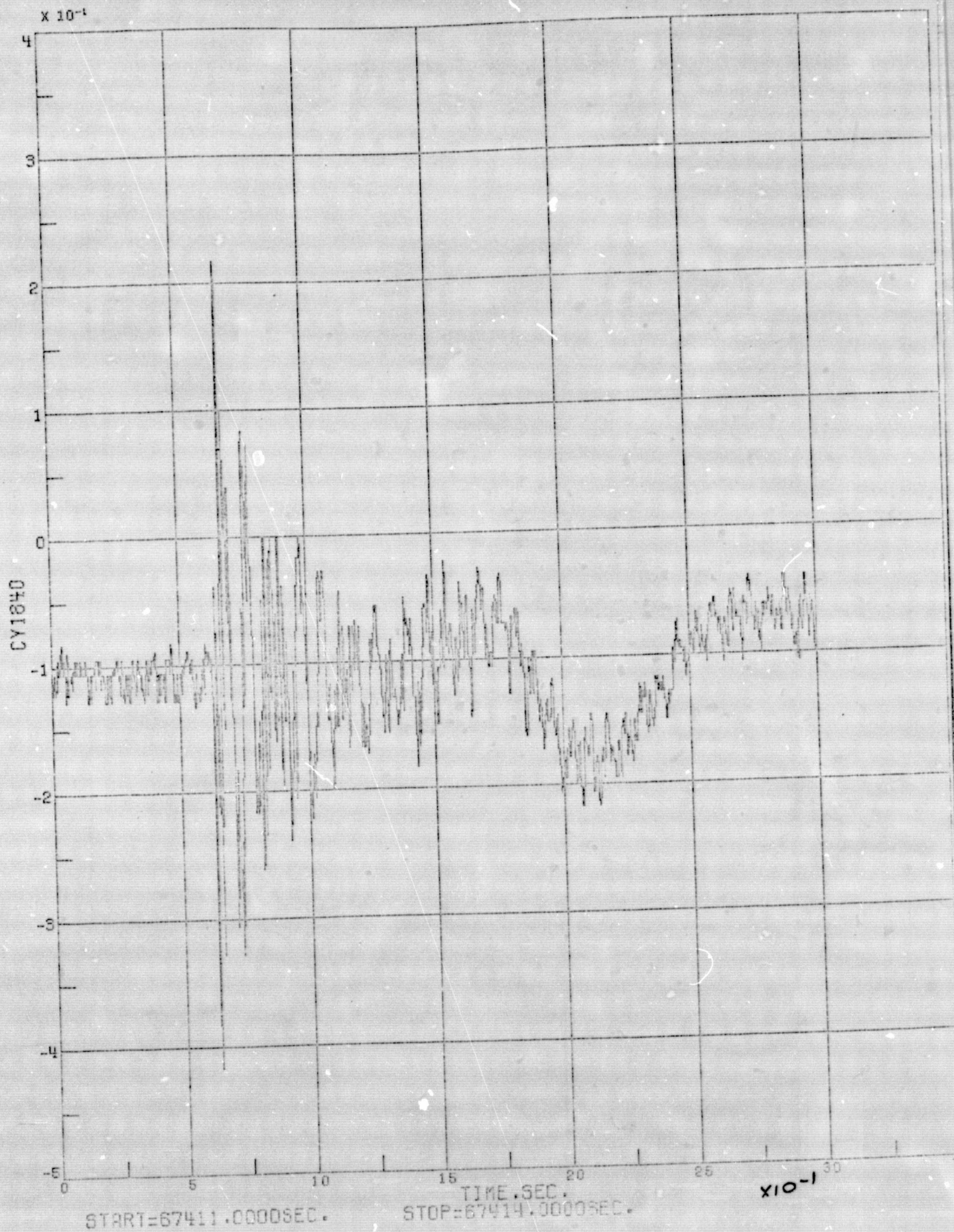
VIKING B

JE TT SHROUD (G81) 1024

9/ CY1830

4.129 b

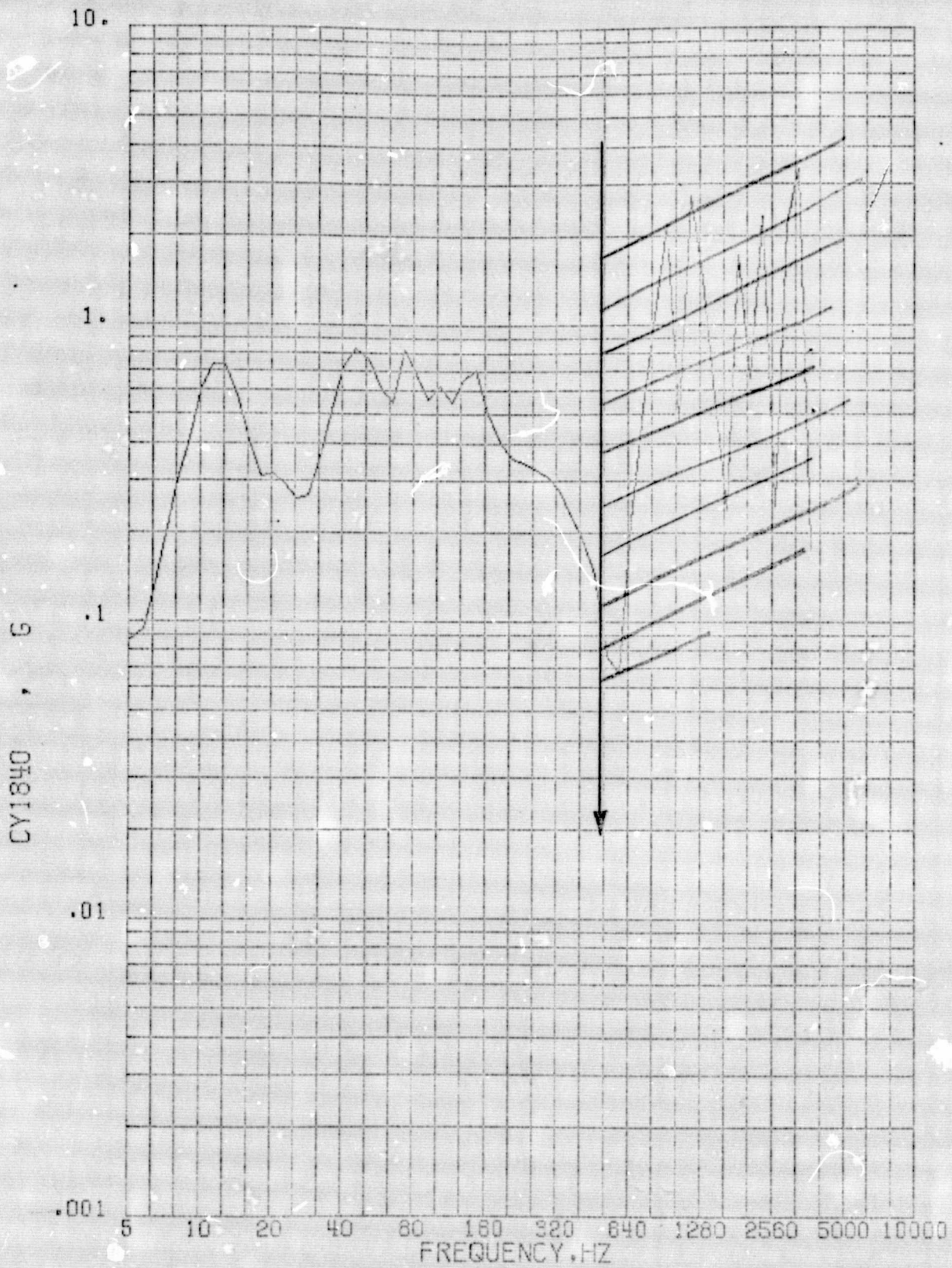
Figure 4.59b



4.1329

Figure 4.60a

SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67414.0000SEC.

Q=10.

VIKING 6

JE TT SHROUD (GBI)

1024

S/ CY1840

4.1236

Figure 4.60b

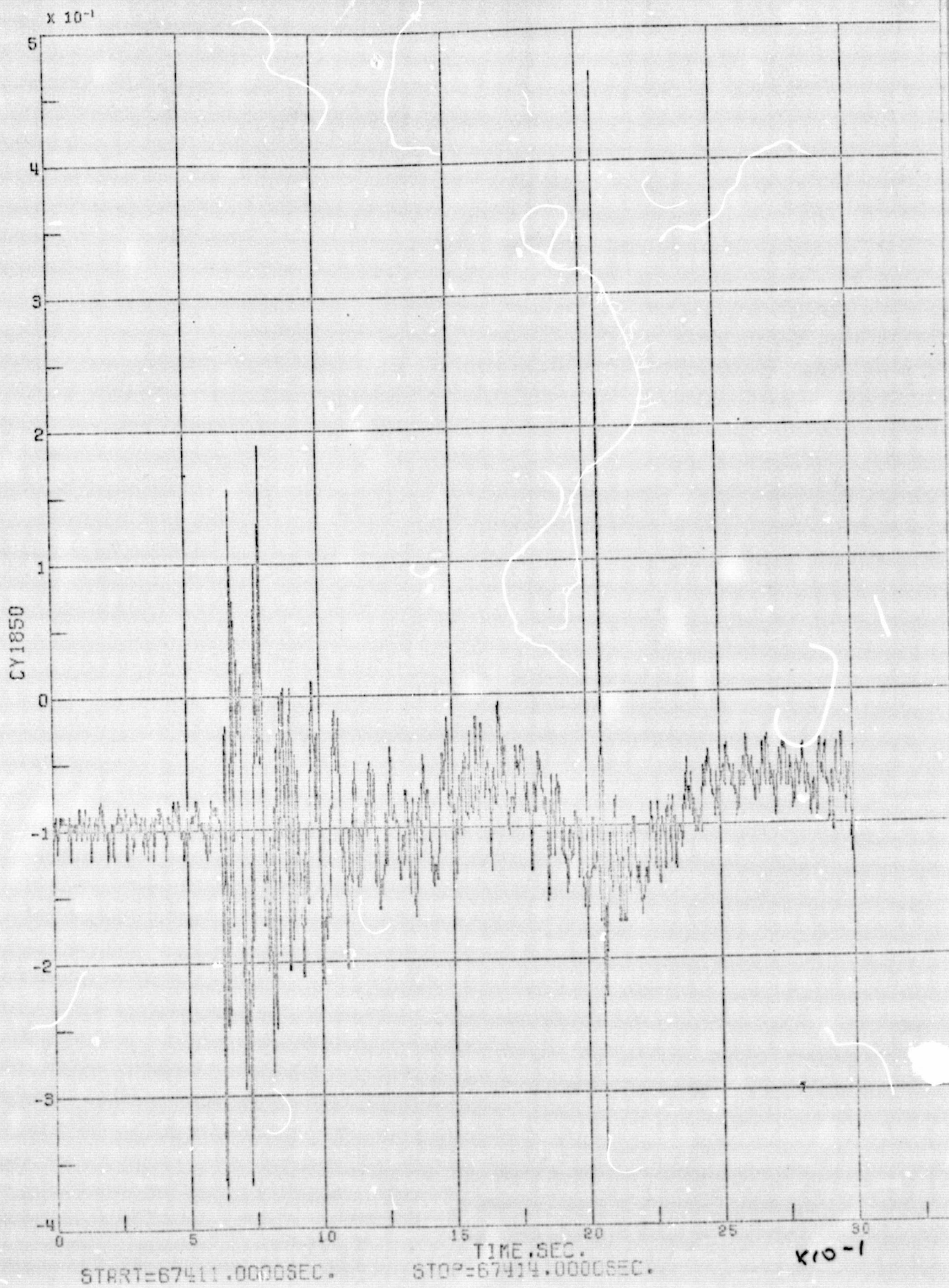
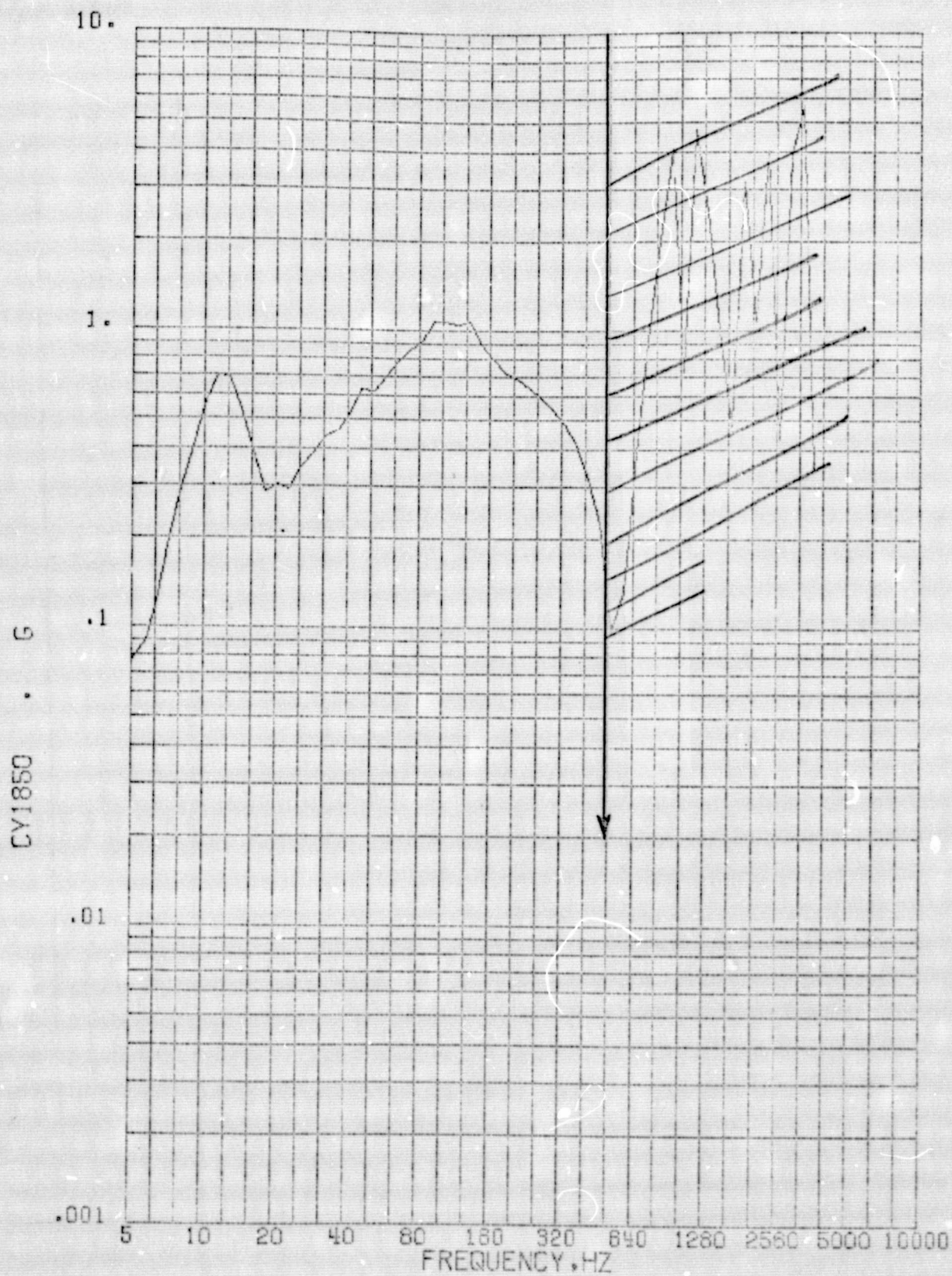


Figure 4. 61a

SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67414.0000SEC.

Q=10.

VIKING B

JE TT SHROUD(GBI)

1024

9/ CV1850

4.6 (4.125)

Figure 4. 61b

ORIGINAL PAGE IS
OF POOR QUALITY

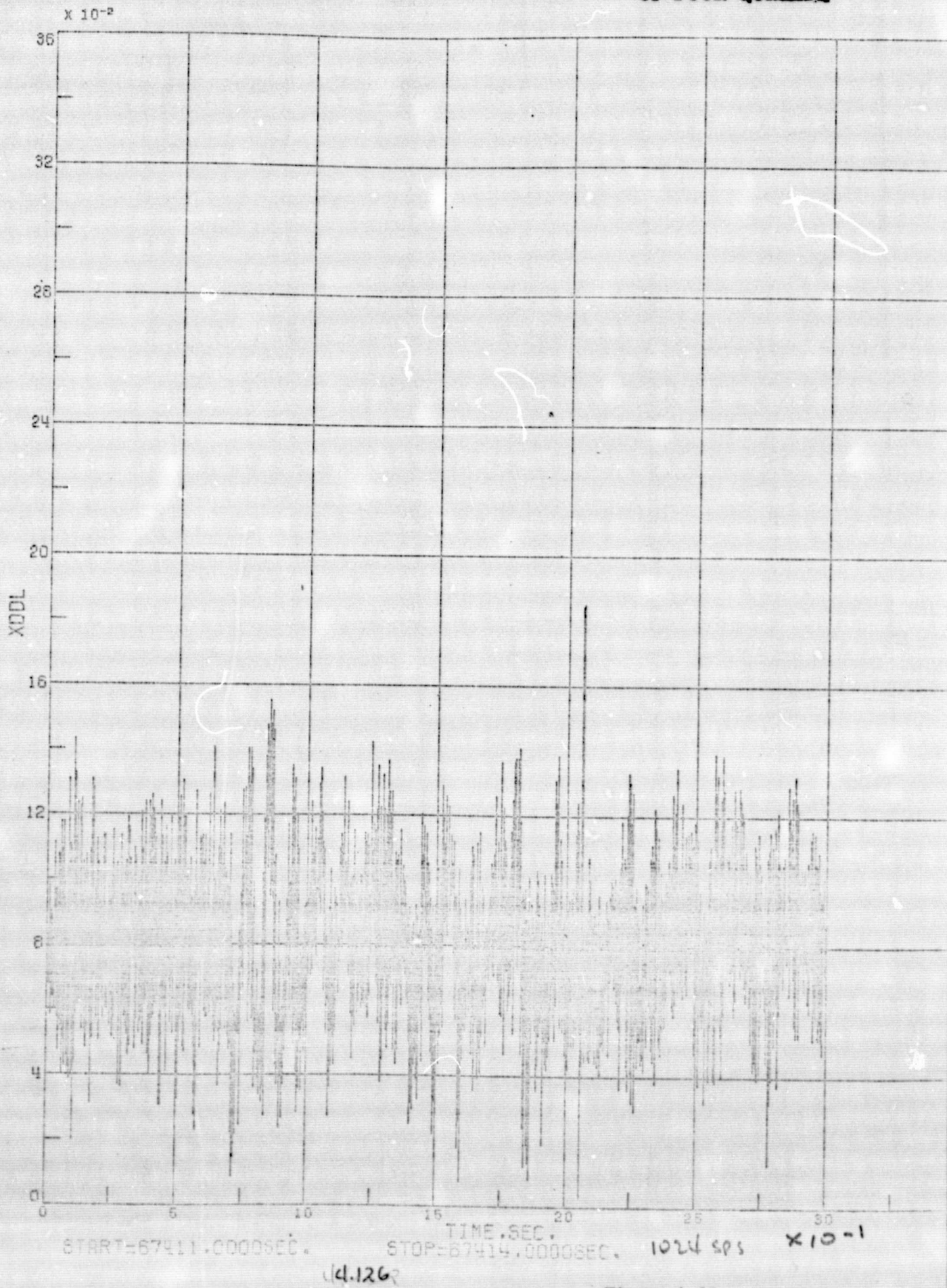
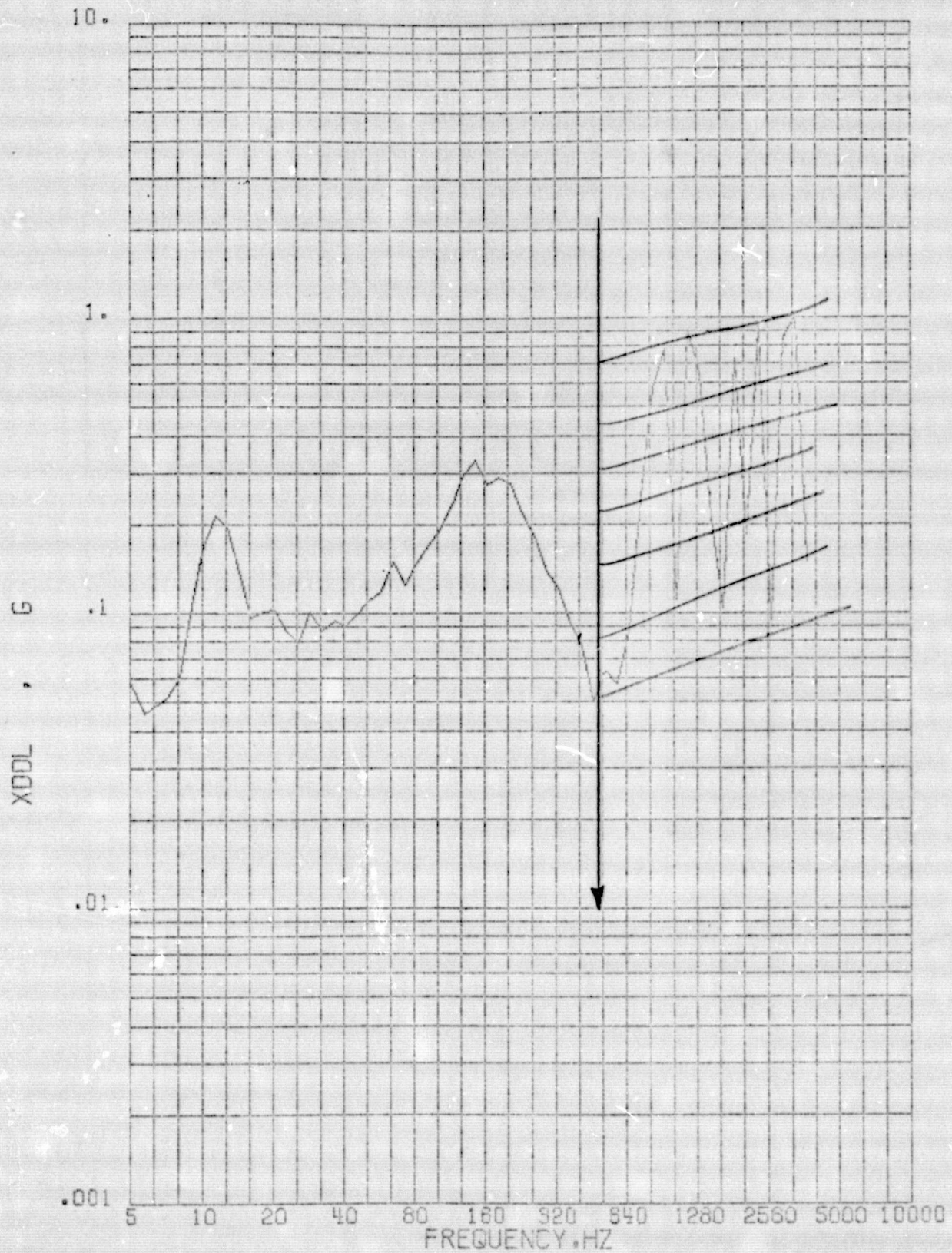


Figure 4. 62a

SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67414.0000SEC.

Q=10.

VIKING B

JE TT SHROUD (GBI)

1024 SPS

S/

XDDL

4.127

Figure 4.62b

$\times 10^{-2}$

26

22

18

14

10

6

2

-2

-6

-10

VDDA

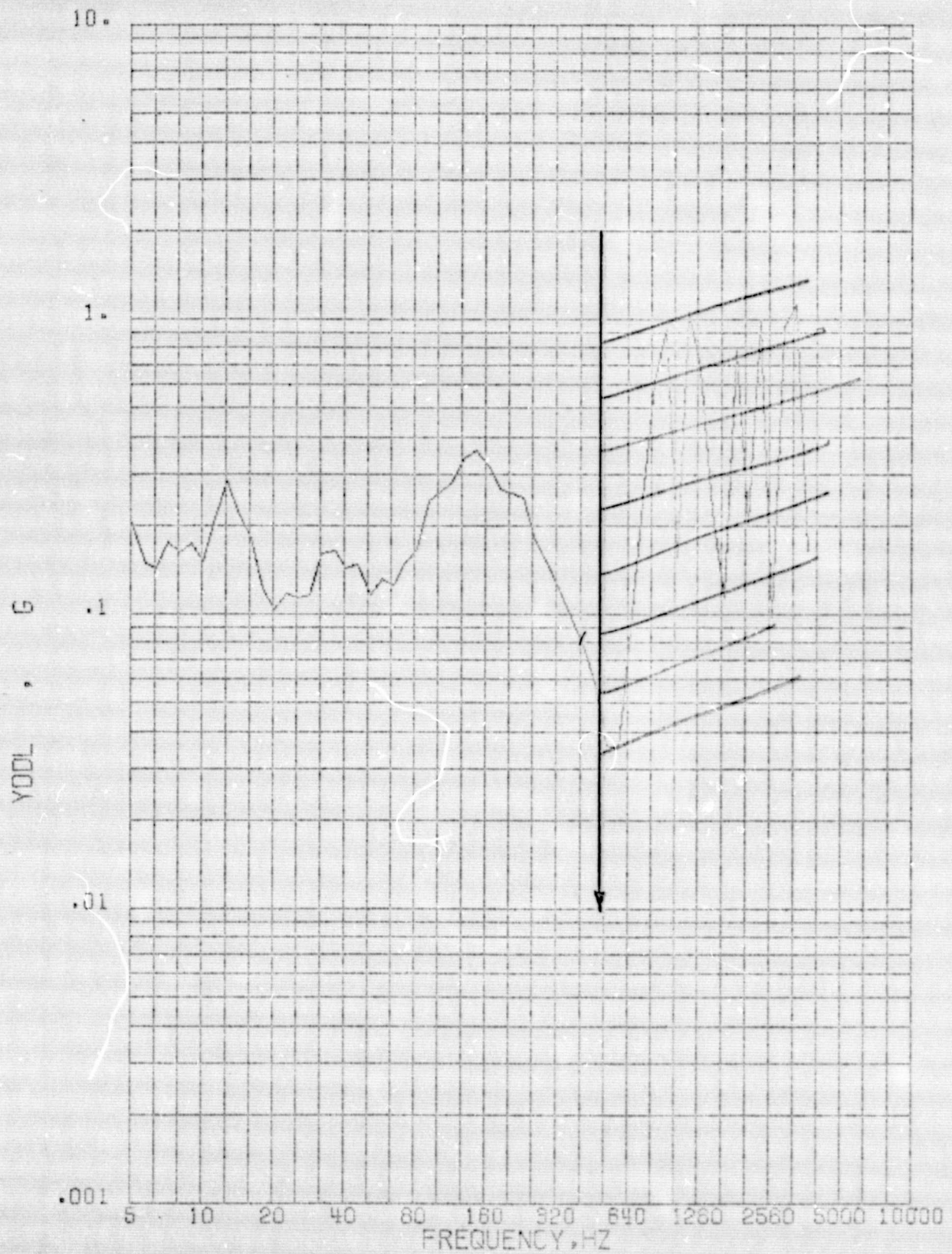
ORIGINAL PAGE IS
OF POOR QUALITY

START=67411.0000SEC. STOP=67414.0000SEC. 1014 505 $\times 10^{-1}$
TIME, SEC.

4128

Figure 4.63a

SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67414.0000SEC.

Q=10.

VIKING B

DE TT SHROUO(GBII)

1024 SPS

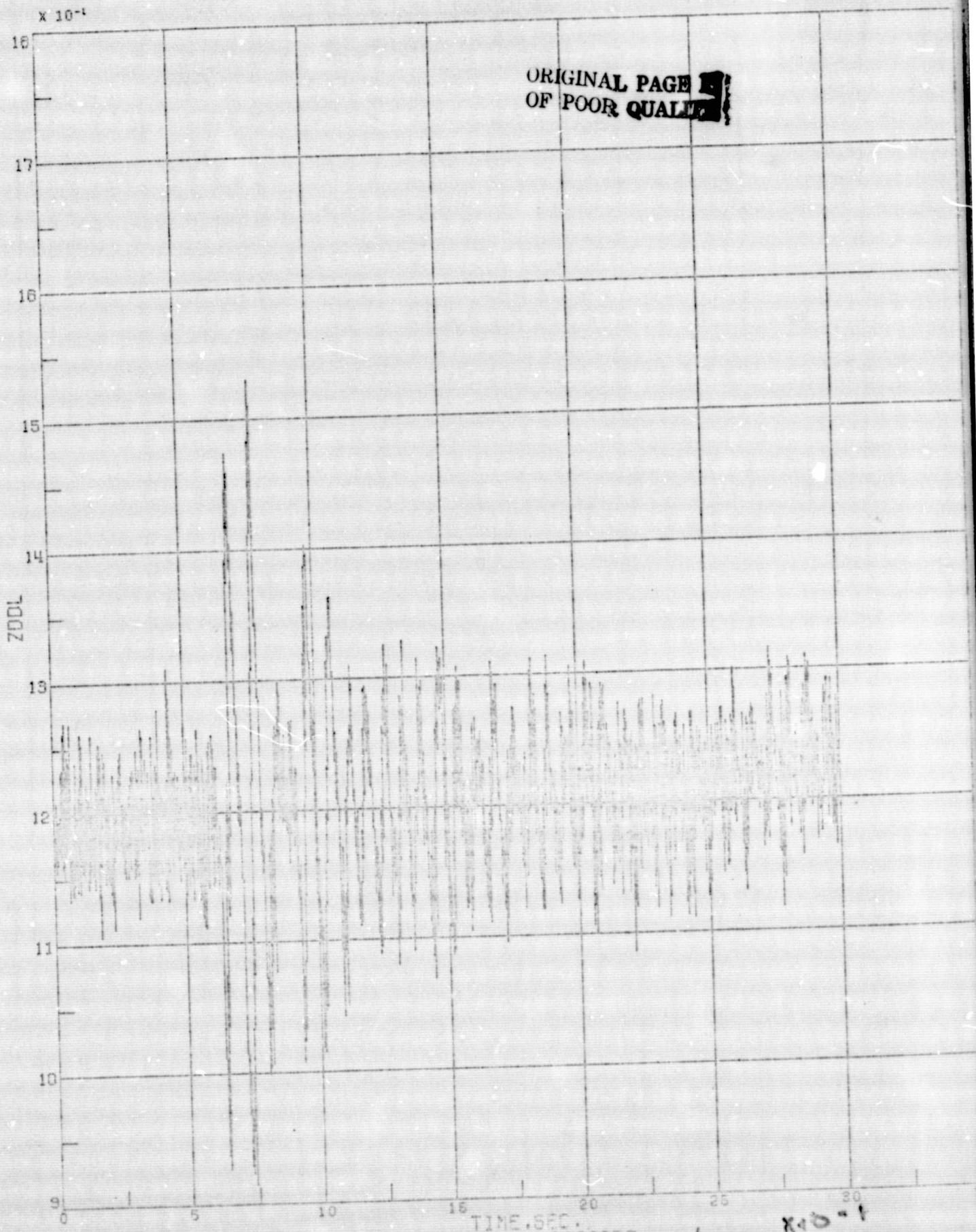
S/

YDDL

8.129 b

Figure 4. 63b

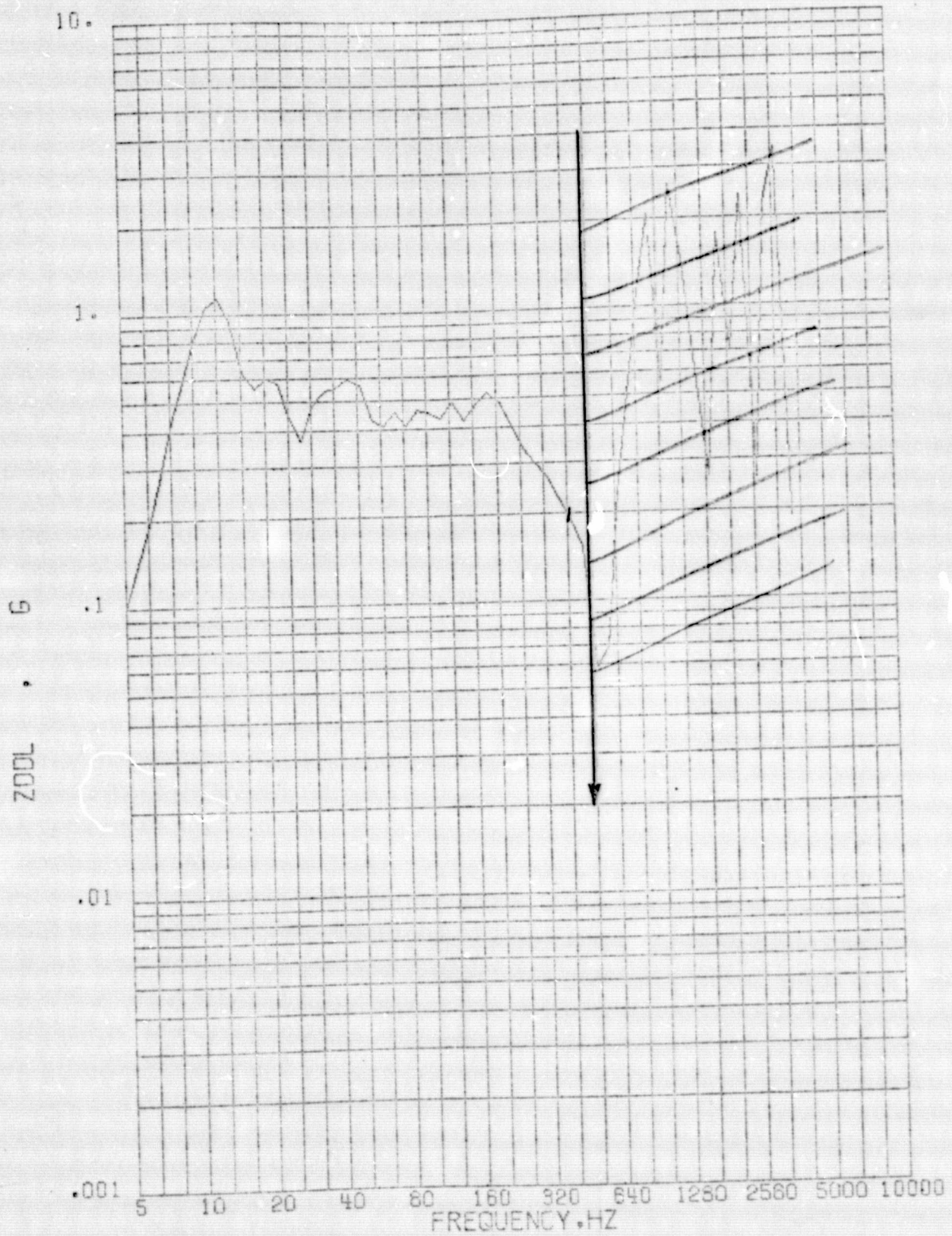
b



4.649 4.130

Figure 4. 64a

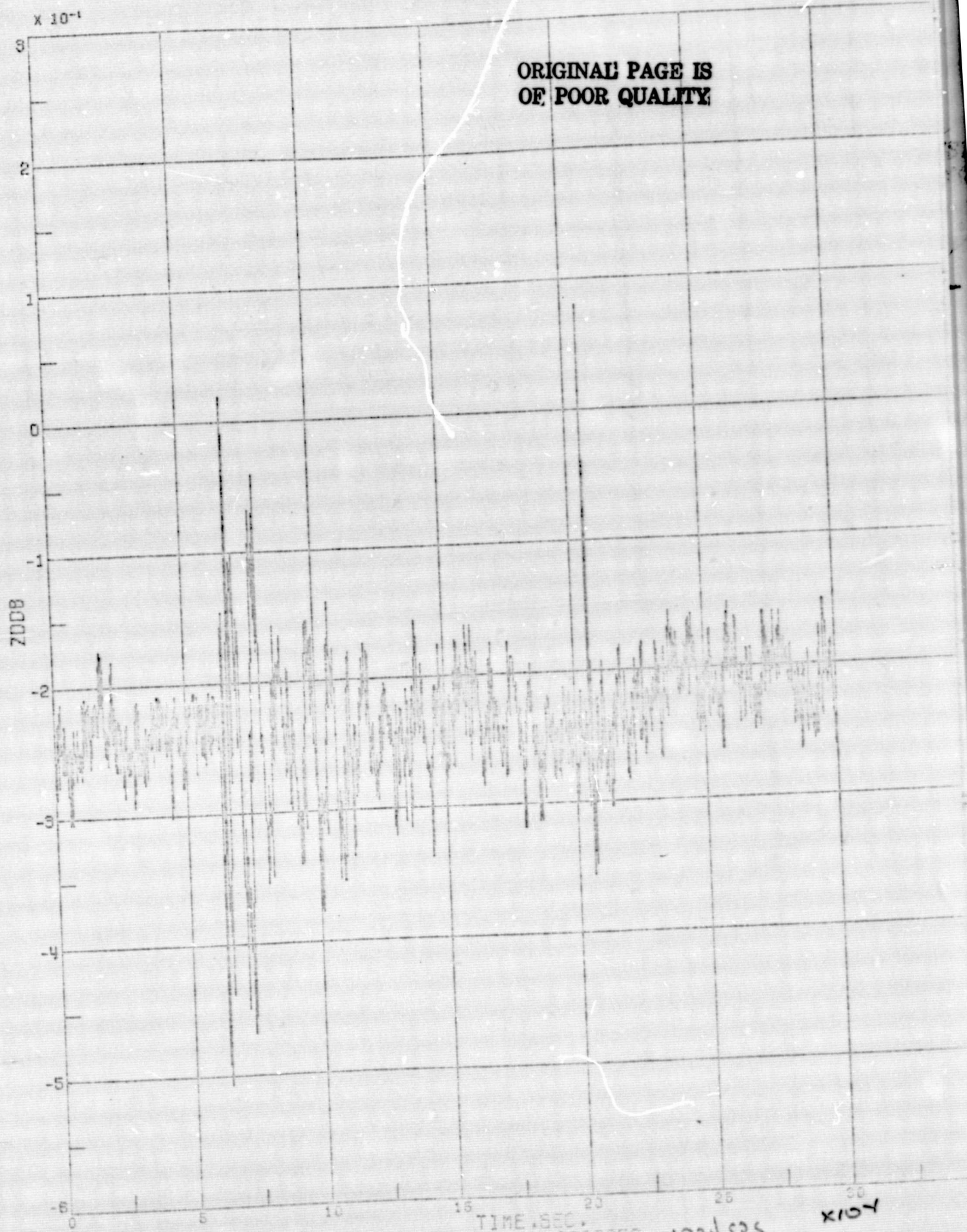
SHOCK SPECTRUM



START=67411.6000SEC. STOP=67414.0000SEC. Q=10.
 VIKING B JE TT SHROUD (GB1) 1024 SPS 9/ Z00L

4.131.4b

Figure 4.64b



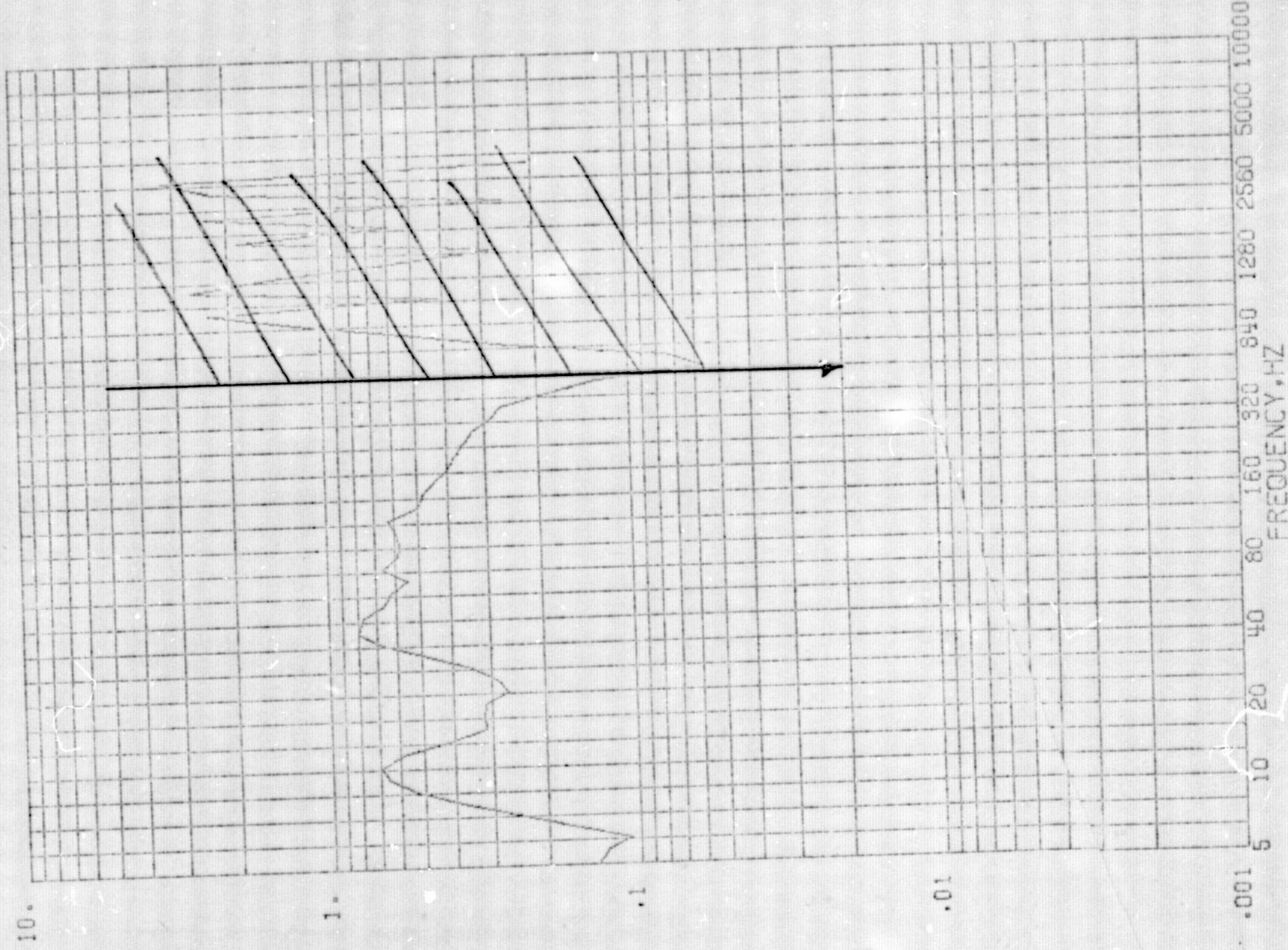
START=67411.0000SEC.

STOP=67414.0000SEC.

Figure 4.65a

X104

SHOCK SPECTRUM



START=67411.6000SEC.

STOP=67414.0000SEC.

Q=10.

VIKING B

JE TT SHROUDIGBI 1024 SPS

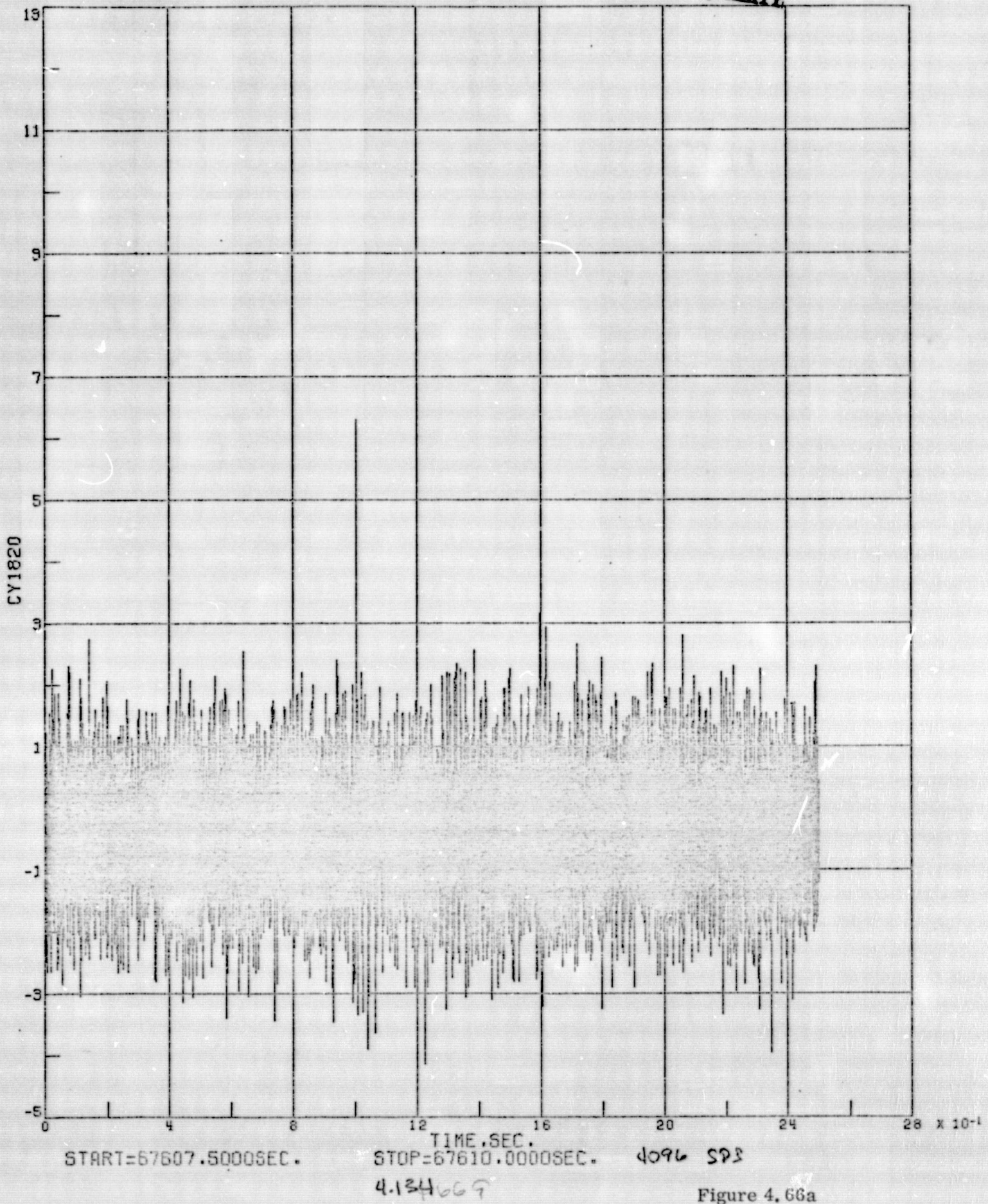
S/

Z008

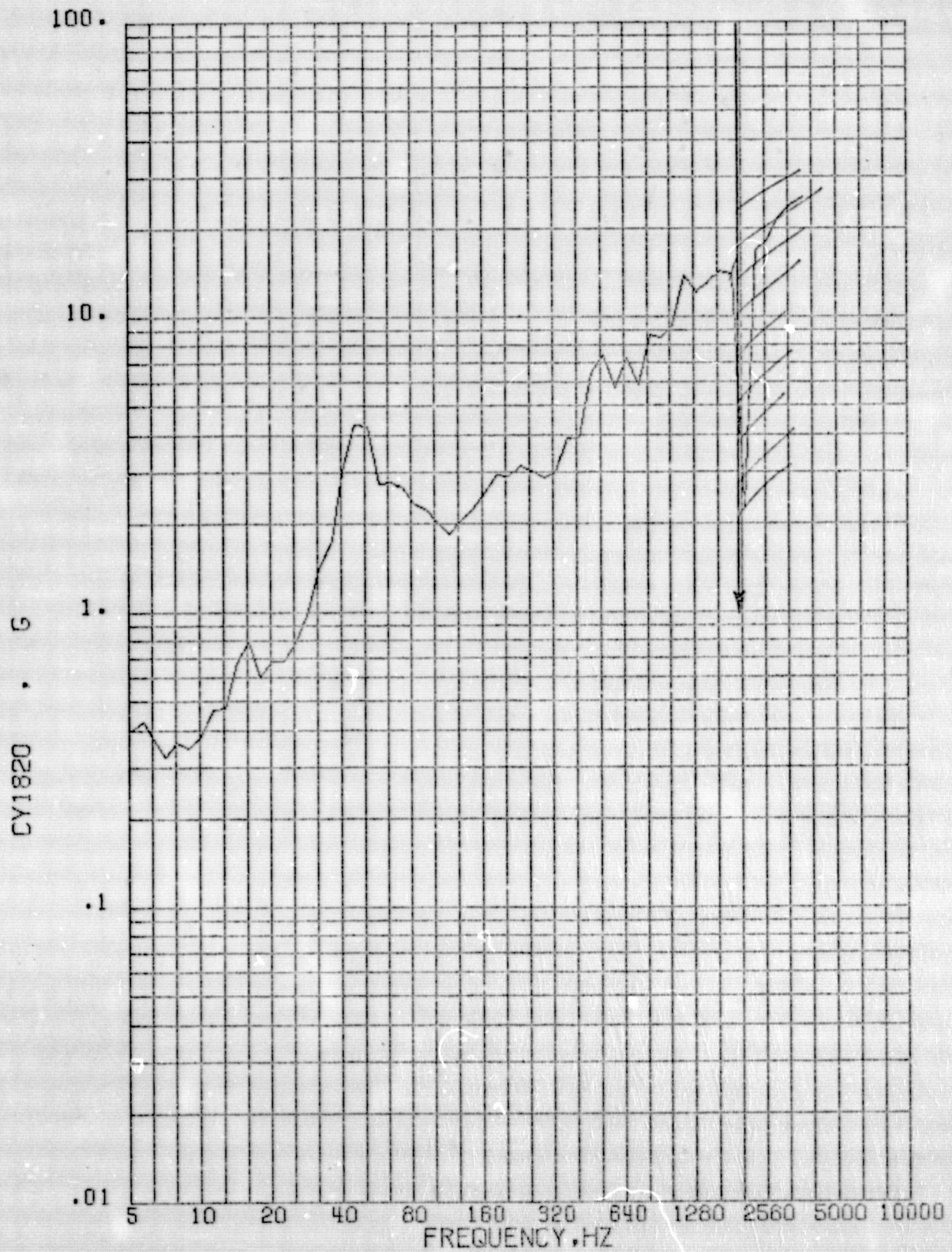
(4.133)

Figure 4. 65b

ORIGINAL PAGE IS
OF POOR QUALITY



SHOCK SPECTRUM



START=67608.2000SEC.

STOP=67610.0000SEC.

Q=10.

VIKING B

ST G 2 80(GBI)

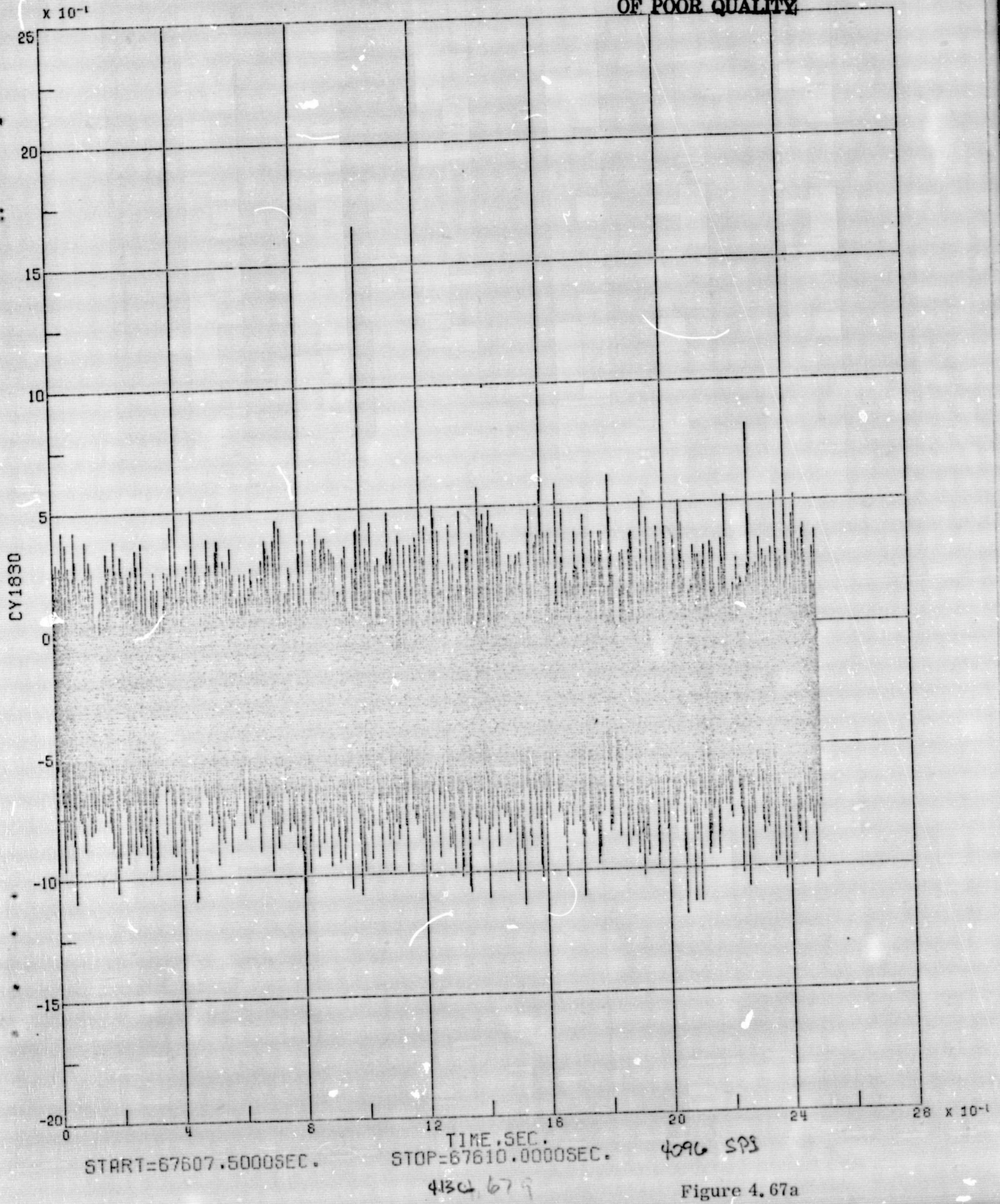
4096 SPS

9/ CY1820

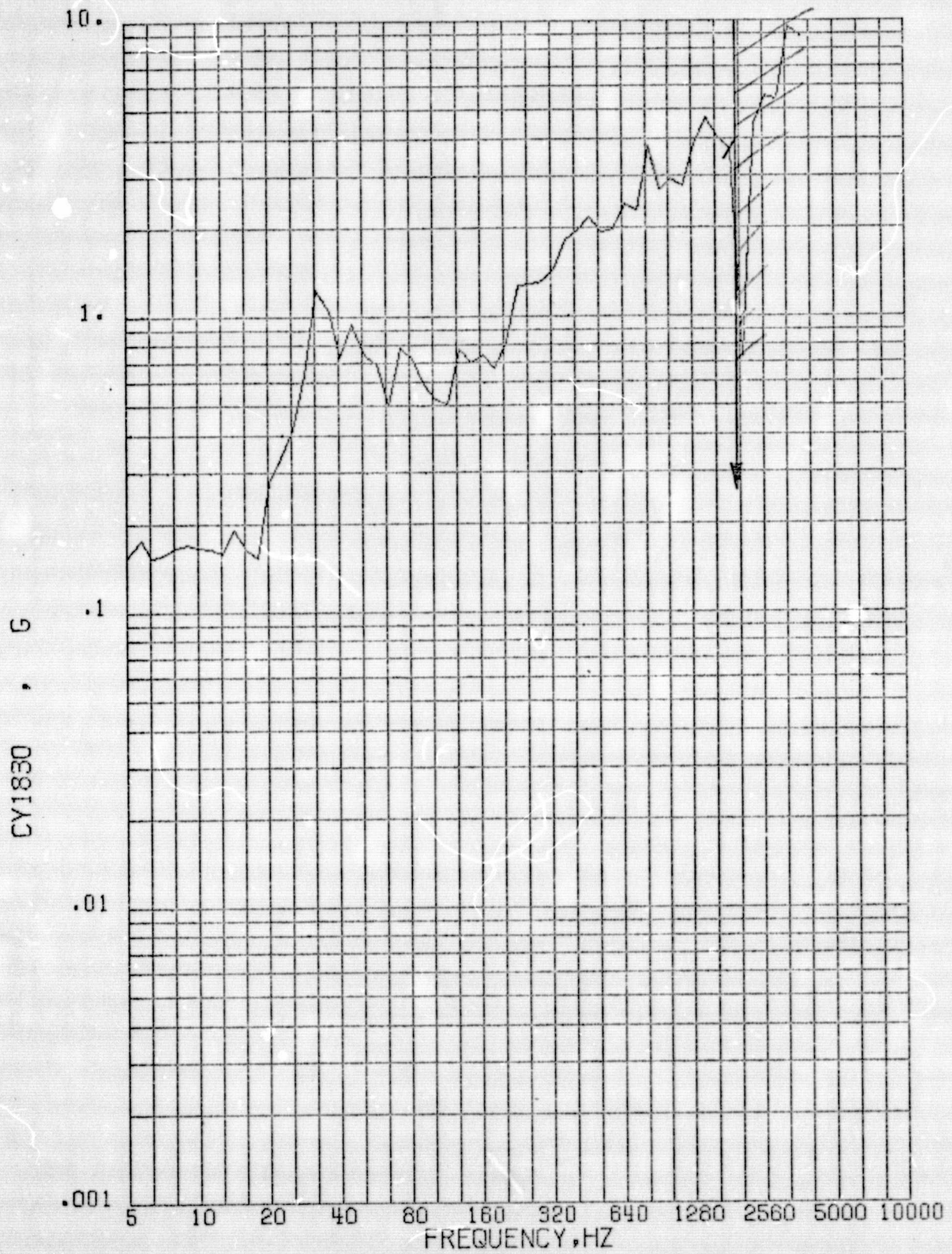
4.35 b

Figure 4.66b

ORIGINAL PAGE IS
OF POOR QUALITY



SHOCK SPECTRUM



START=67608.2000SEC.

STOP=67610.0000SEC.

Q=10.

VIKING B

ST G 2 BO(GBI)

4096 SPS

9/ CY1830

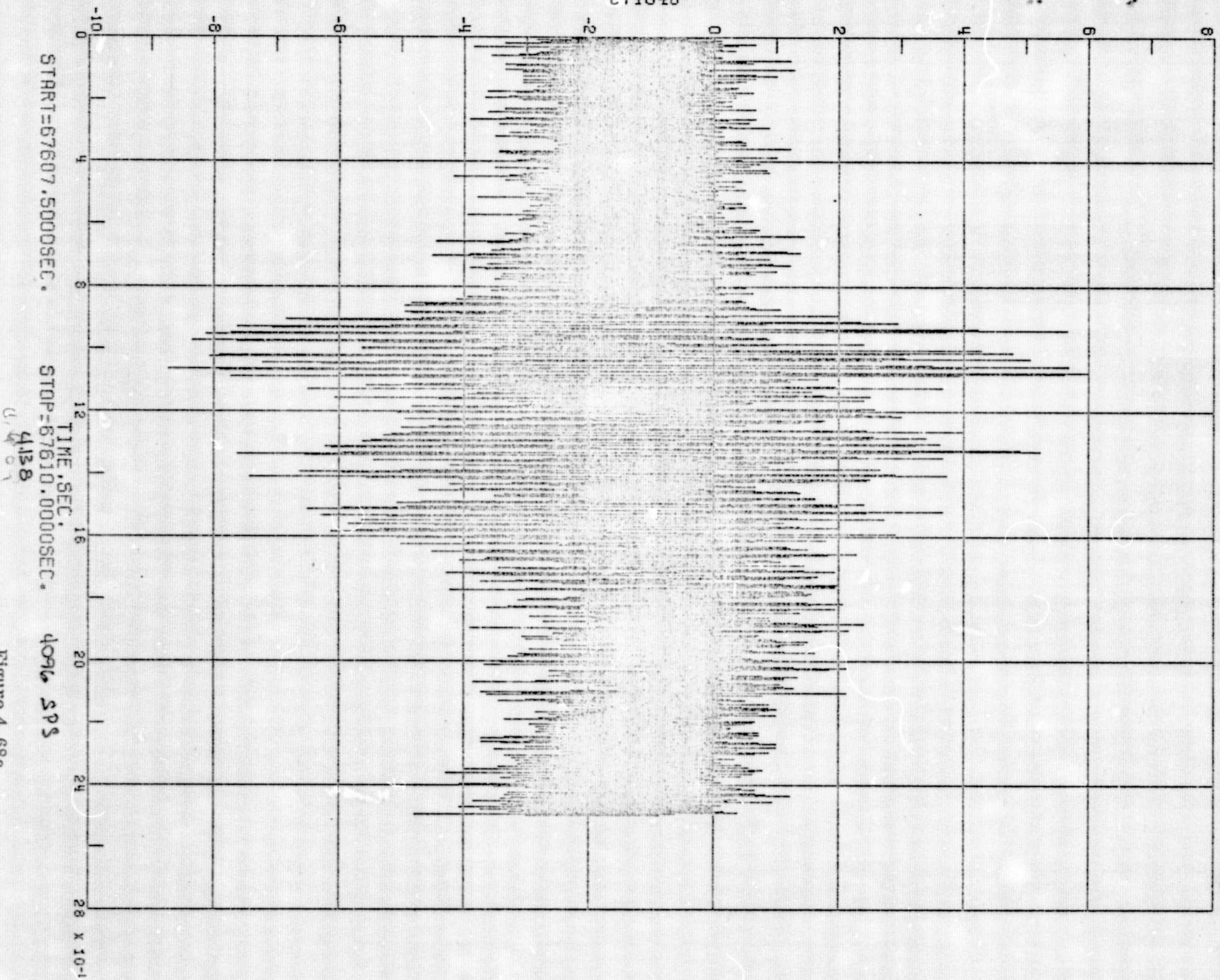
4.67b
4.137

Figure 4. 67b

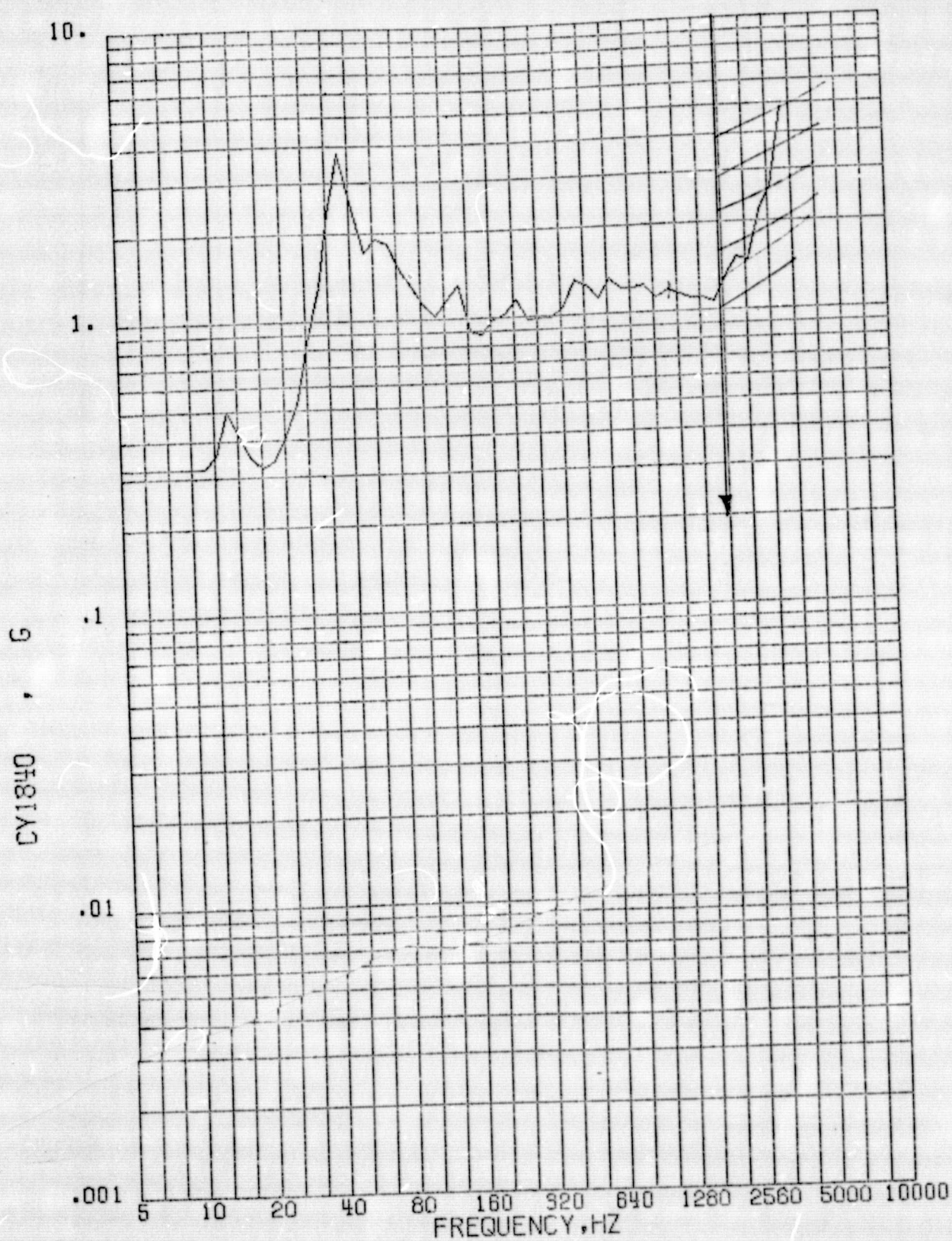
ORIGINAL PAGE IS
OF POOR QUALITY

X 10⁻¹

CY1840



SHOCK SPECTRUM



START=67608.2000SEC.

STOP=67610.0000SEC.

Q=10.

VIKING B

ST G 2 80(GBI)

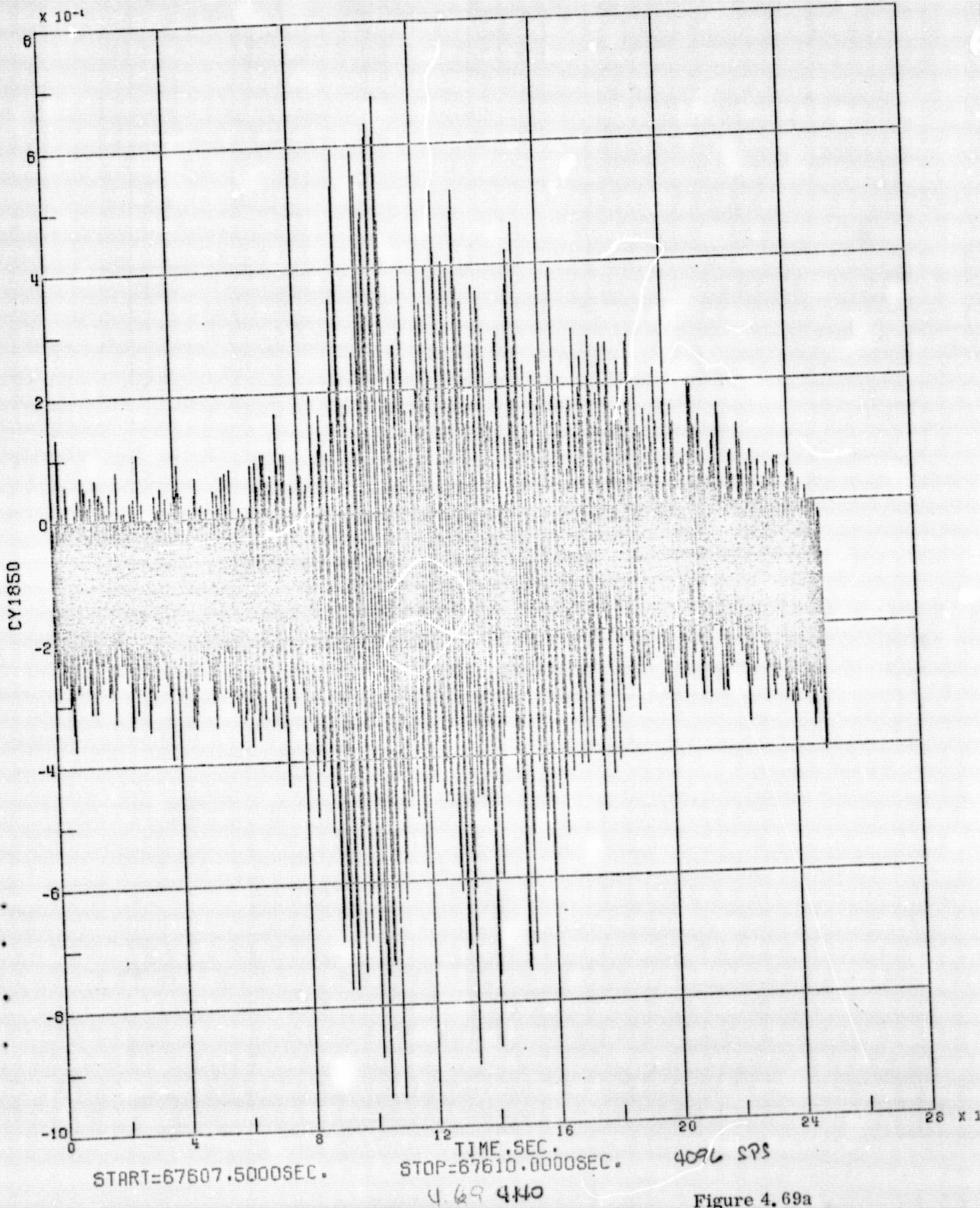
4096 SPS

9/ CY1840

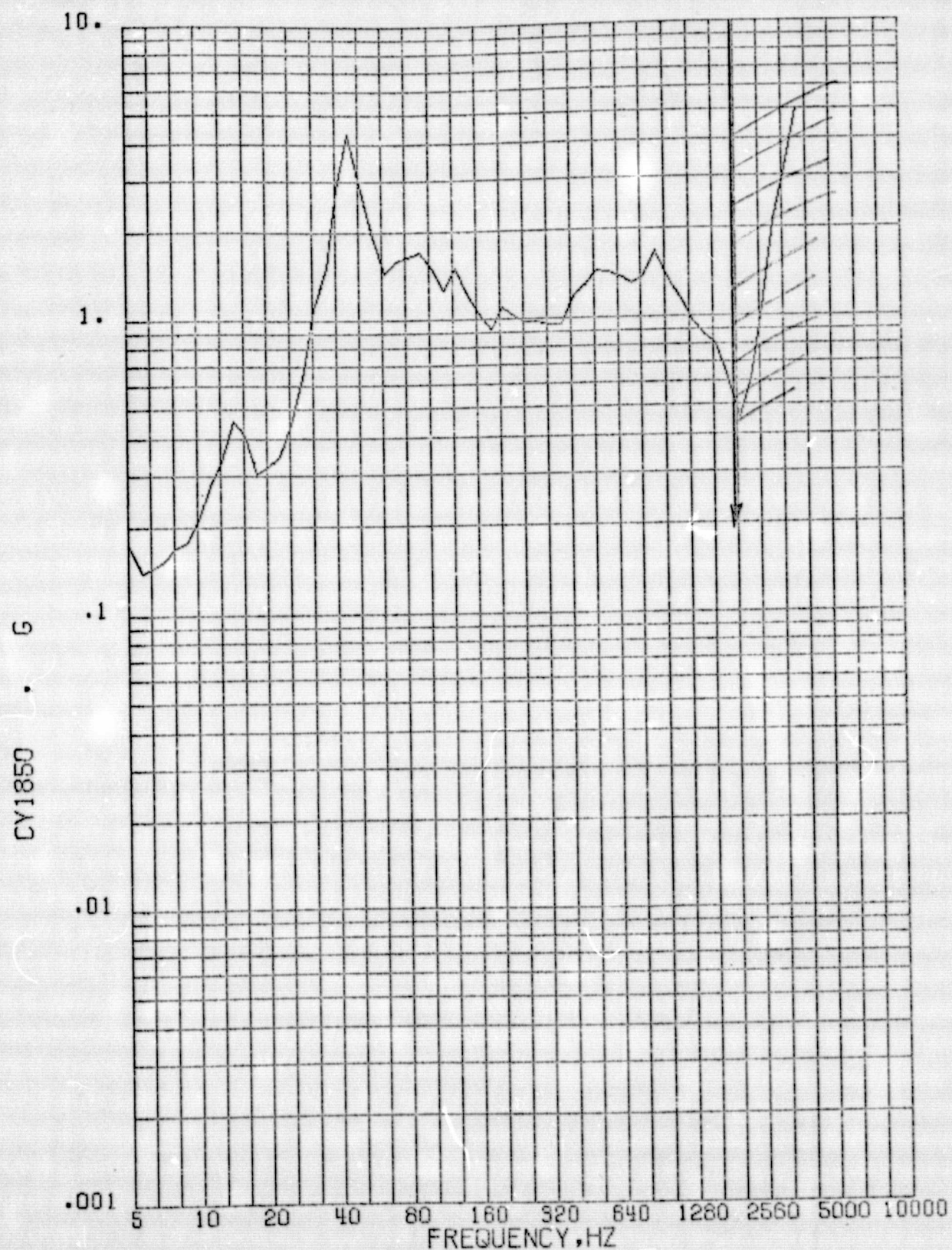
4.656
4139

Figure 4.68b

ORIGINAL PAGE IS
OF POOR QUALITY



SHOCK SPECTRUM



START=67608.2000SEC.

STOP=67610.0000SEC.

Q=10.

VIKING B

ST G 2 BO(GBI)

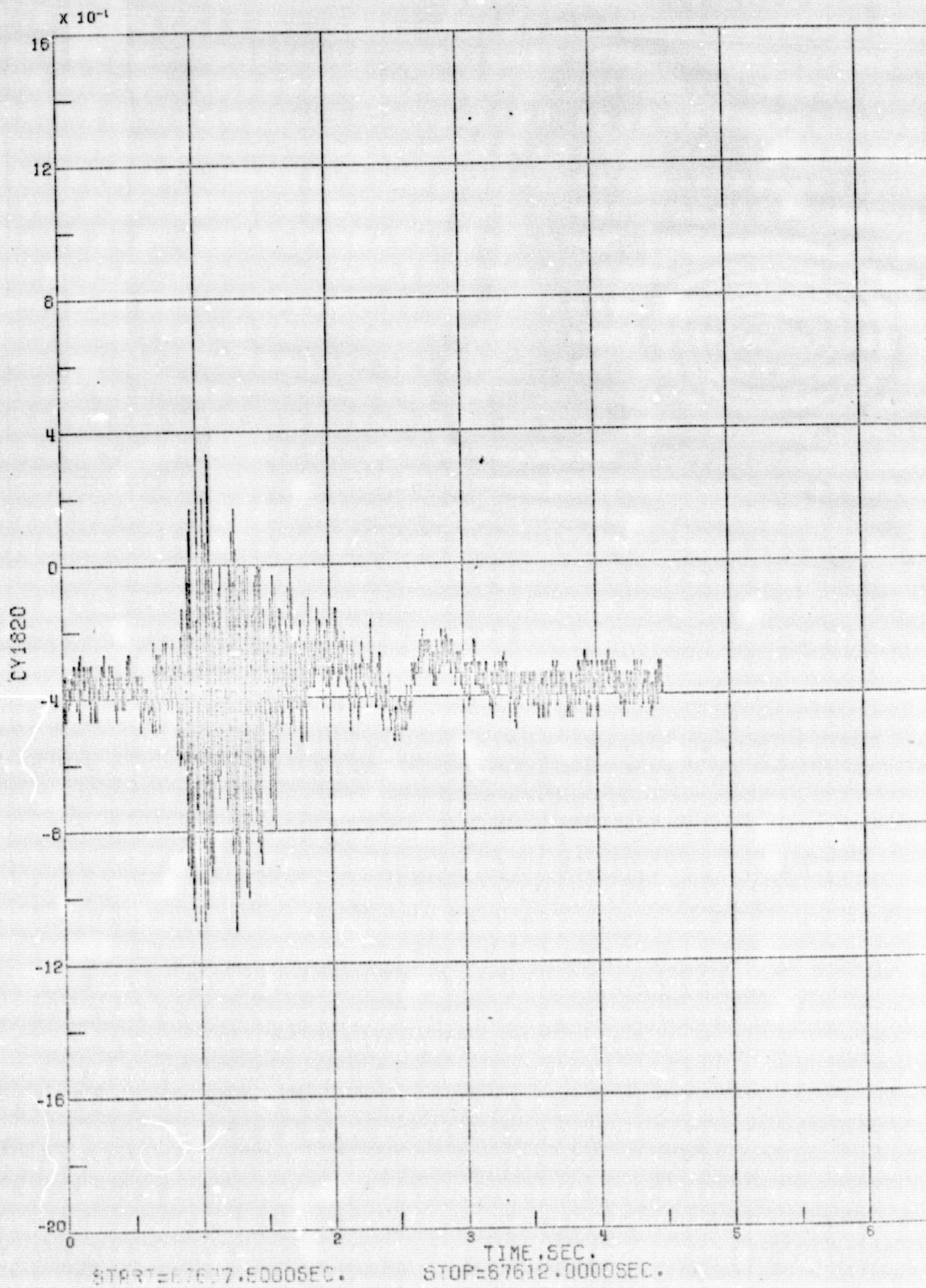
9/ CY1850

4.696

4096 SPS

4441

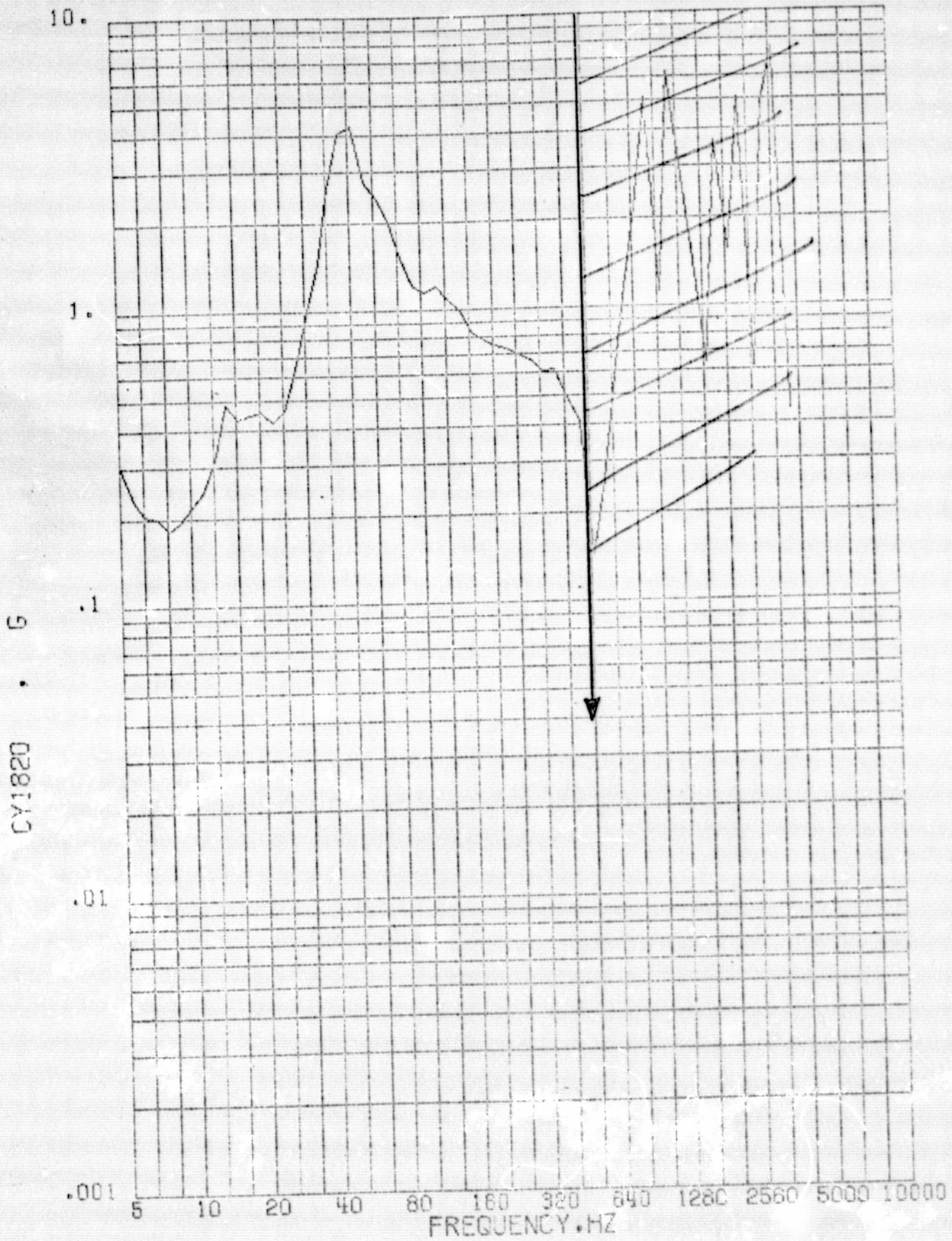
Figure 4.69b



4.70 94.12

Figure 4.70a

SHOCK SPECTRUM



START=67608.2000SEC. STOP=67612.0000SEC. Q=10.

VIKING B

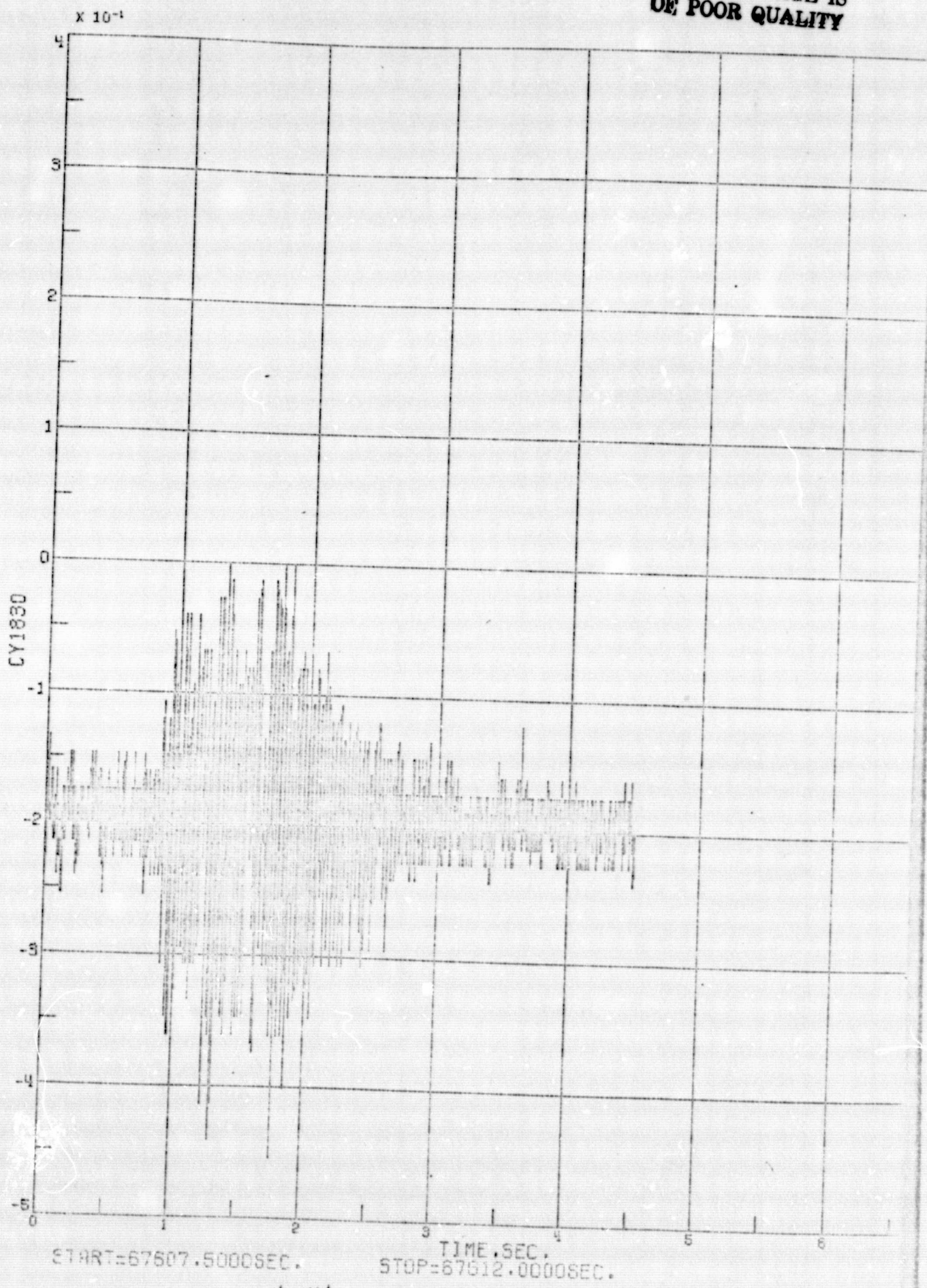
ST G 2 80(G31) 1024

9/ CY1820

4.706
4.143

Figure 4.70b

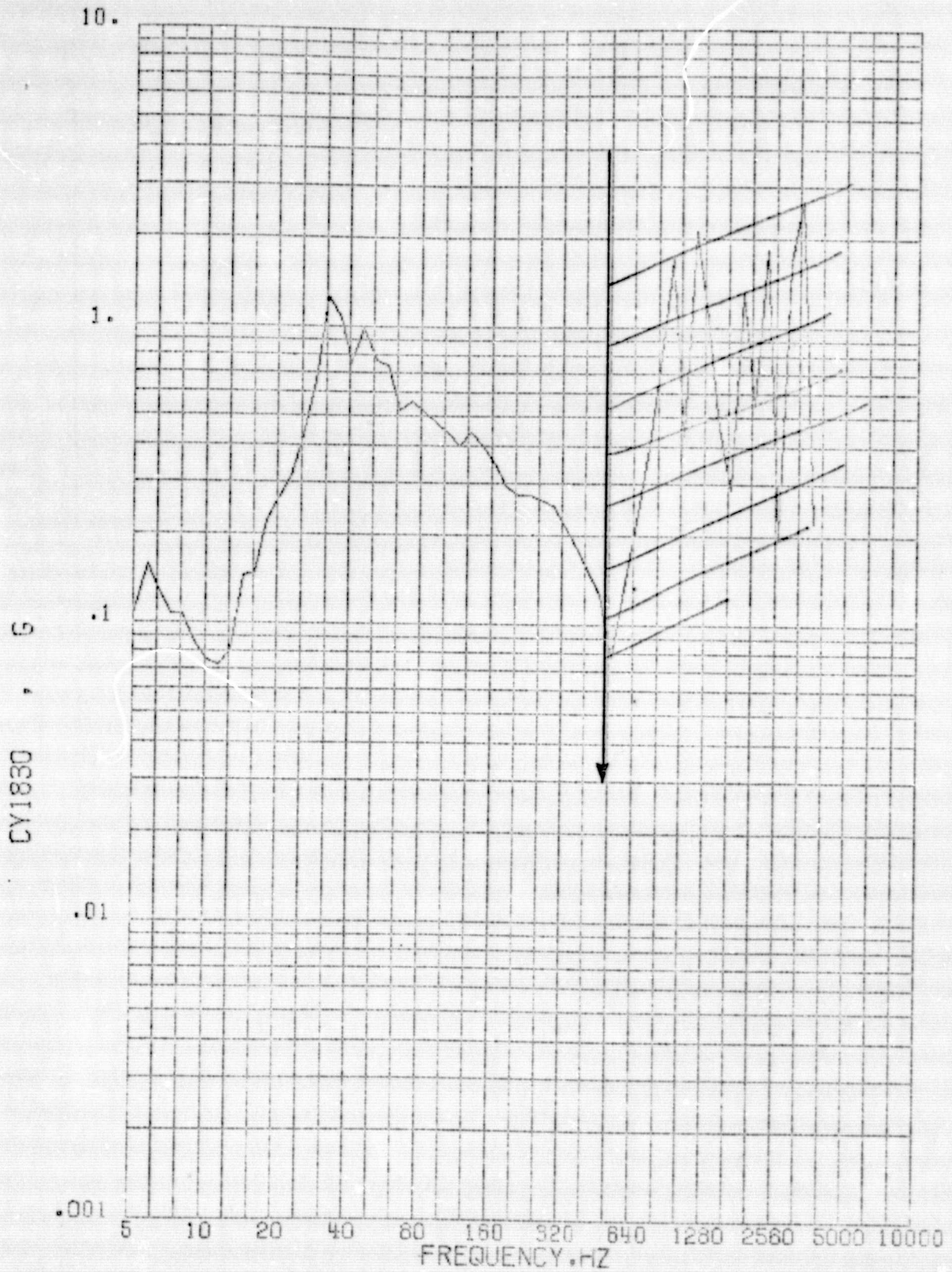
ORIGINAL PAGE IS
OF POOR QUALITY



4.144

Figure 4.71a

SHOCK SPECTRUM



START=67608.2000SEC.

STOP=67612.0000SEC.

G=10.

VIKING B

ST G 2 80(GBI)

1024

S/ CY1830

4.145

Figure 4.71b

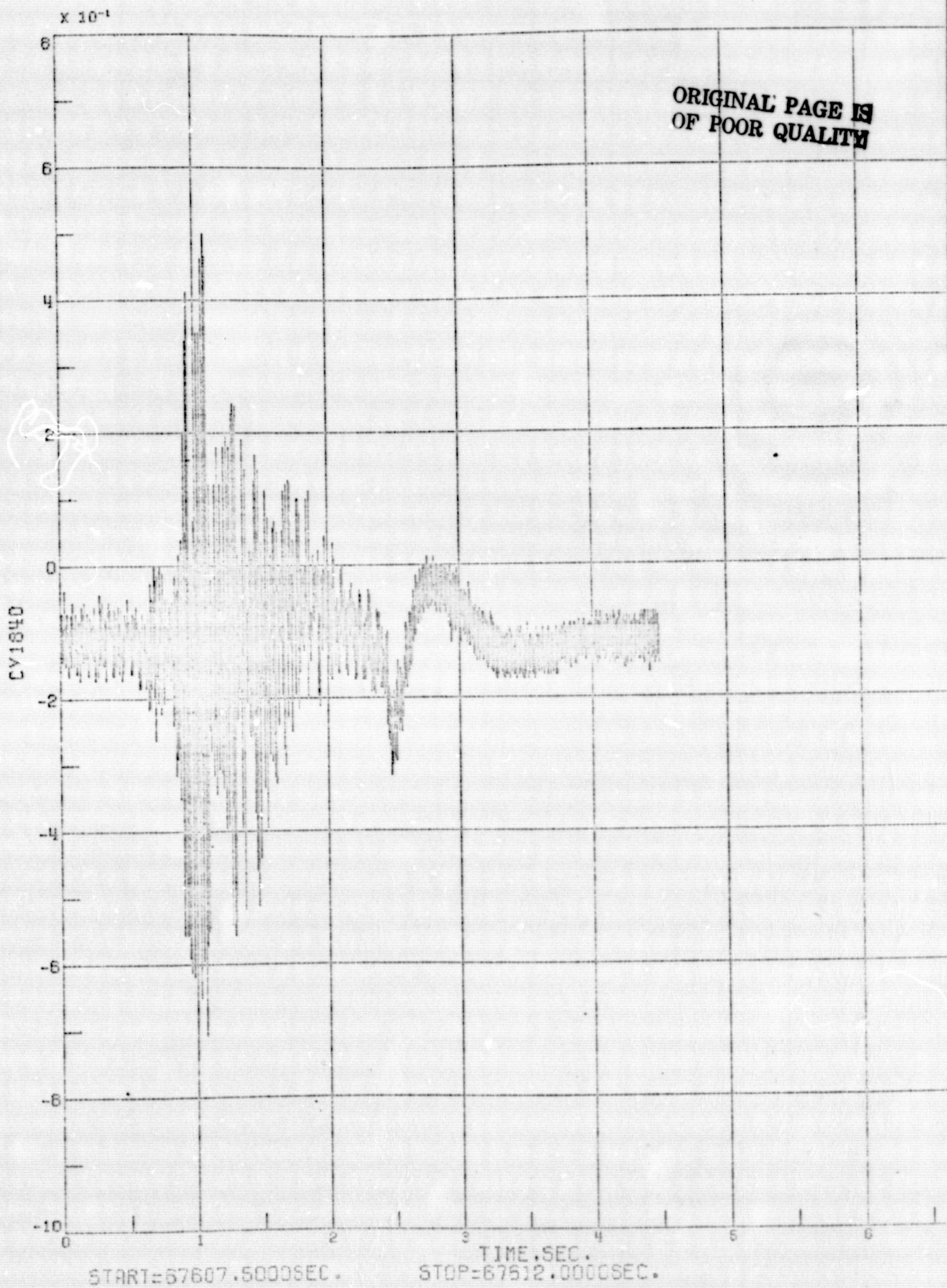
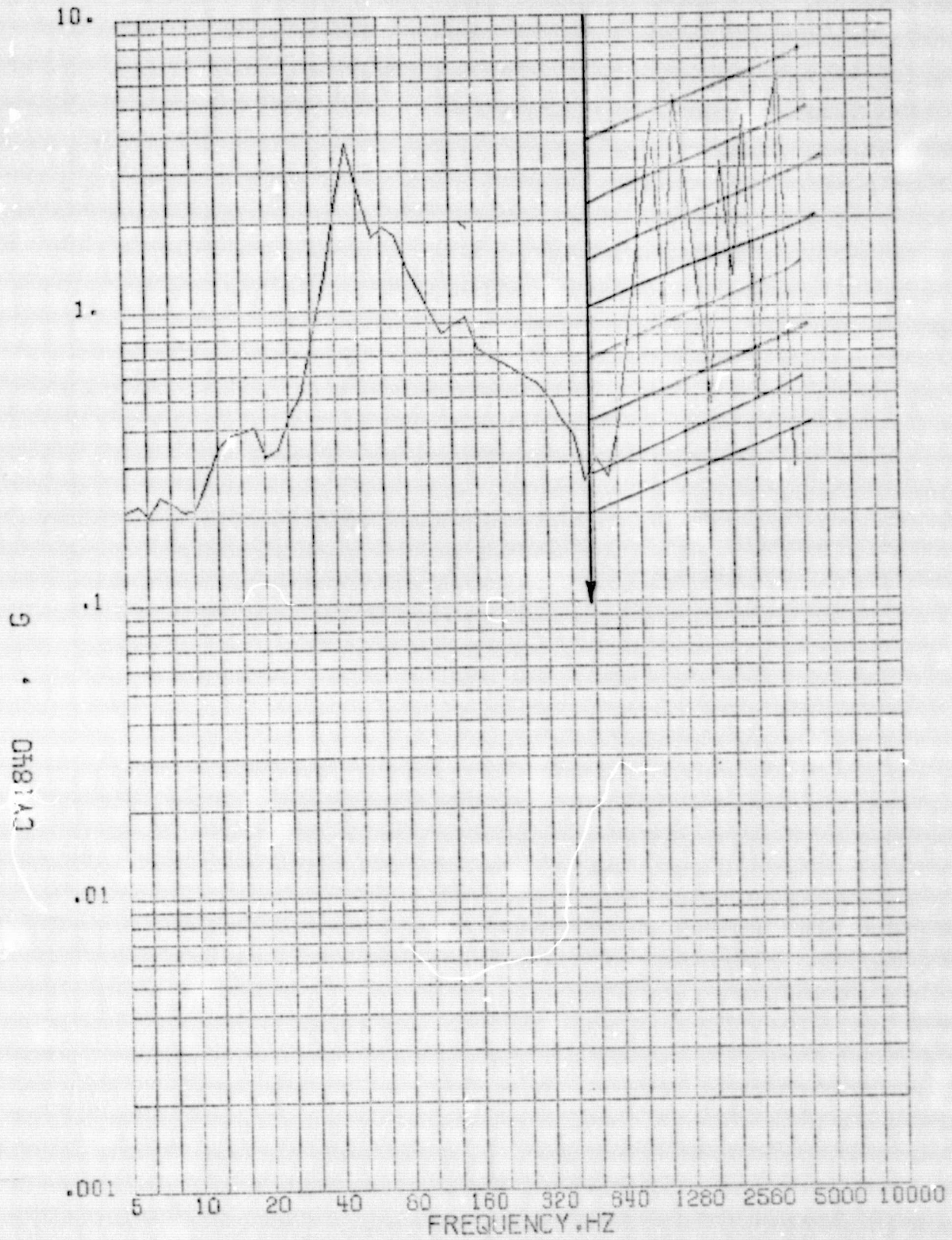


Figure 4.72a

SHOCK SPECTRUM



START=67608.2000SEC.

STOP=67612.0000SEC.

Q=10.

VIKING B

ST G 2 80(GBI)

1024

9/ CY1840

U.74.147

Figure 4.72b

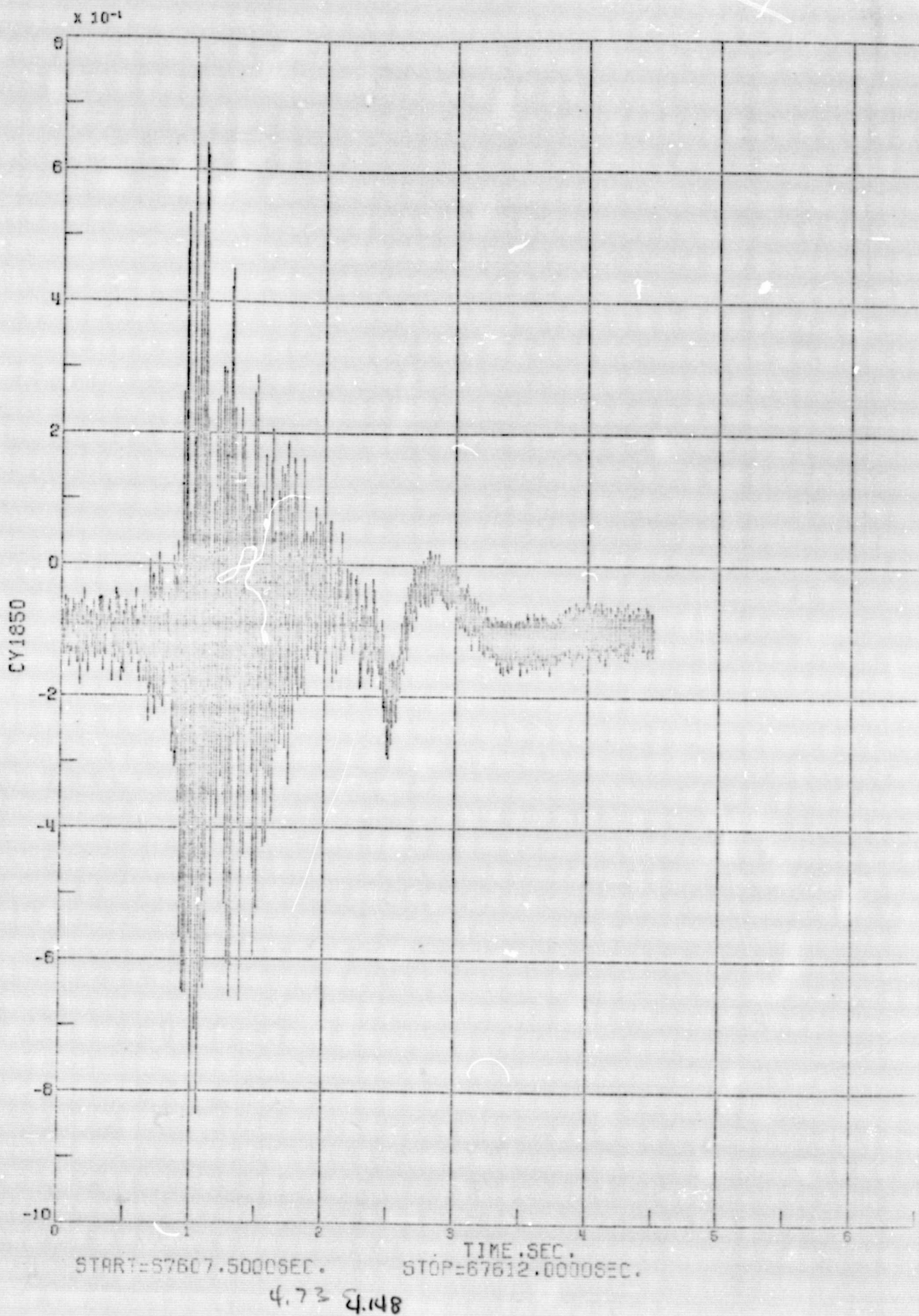
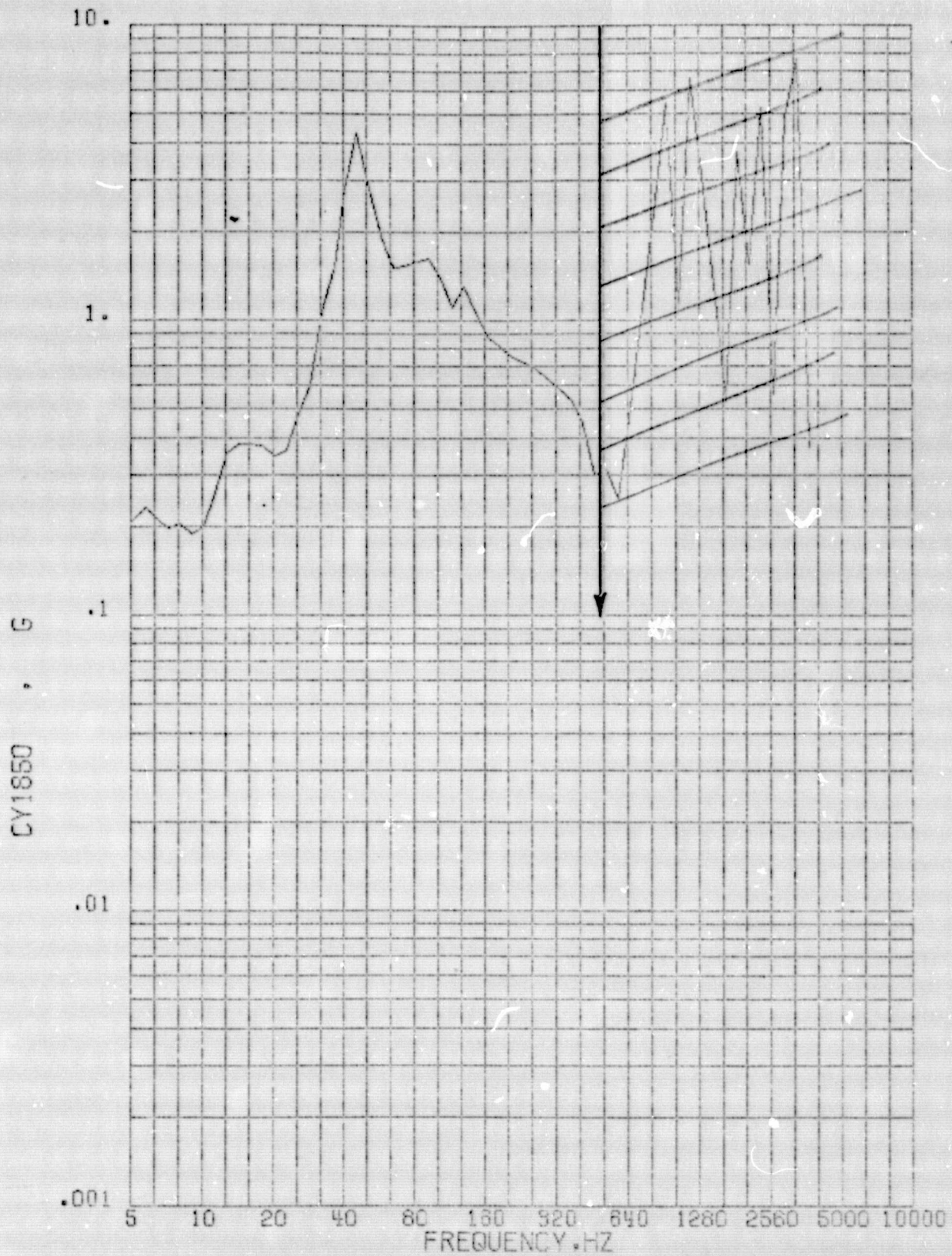


Figure 4.73a

SHOCK SPECTRUM



START=67608.2000SEC.

STOP=67612.0000SEC.

Q=10.

VIKING B

ST G 2 BO(GBI)

1024

9/ CY1850

4.73 4.149

Figure 4.73b

ORIGINAL PAGE IS
OF POOR QUALITY

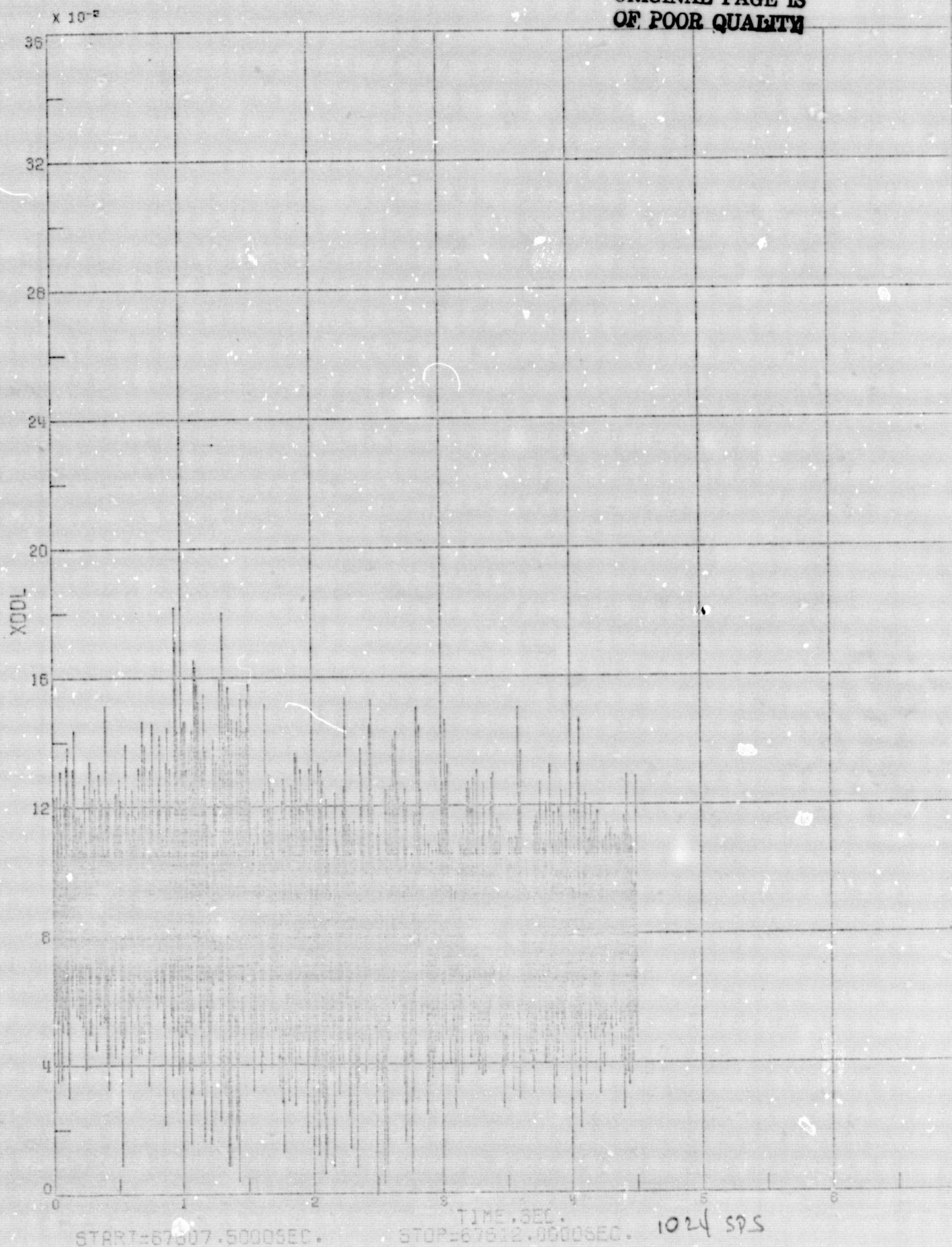
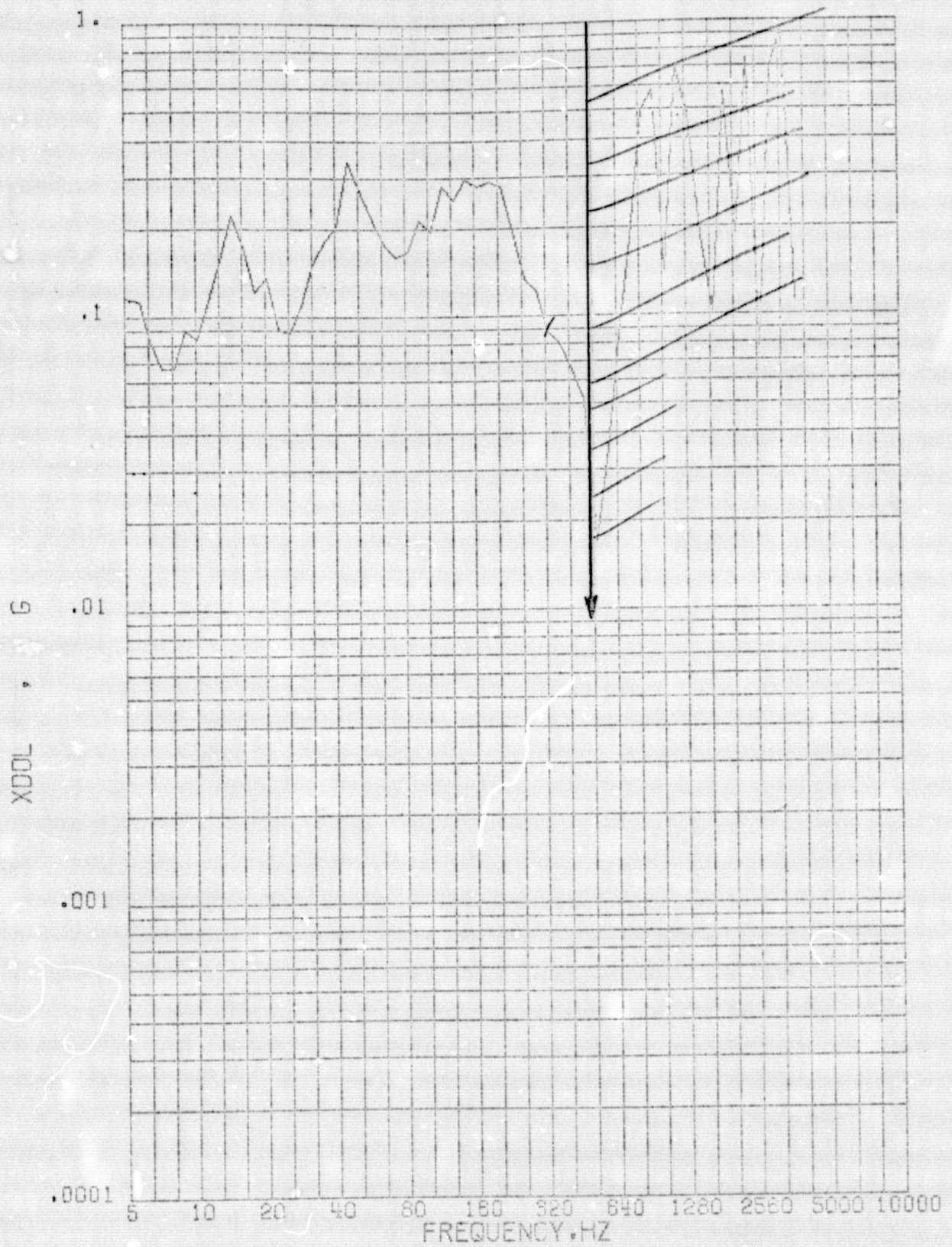


Figure 4.74a

SHOCK SPECTRUM



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STOP=67612.0000SEC.

Q=10.

VIKING B

ST G 2 BO (GBI)

1024 SPS.

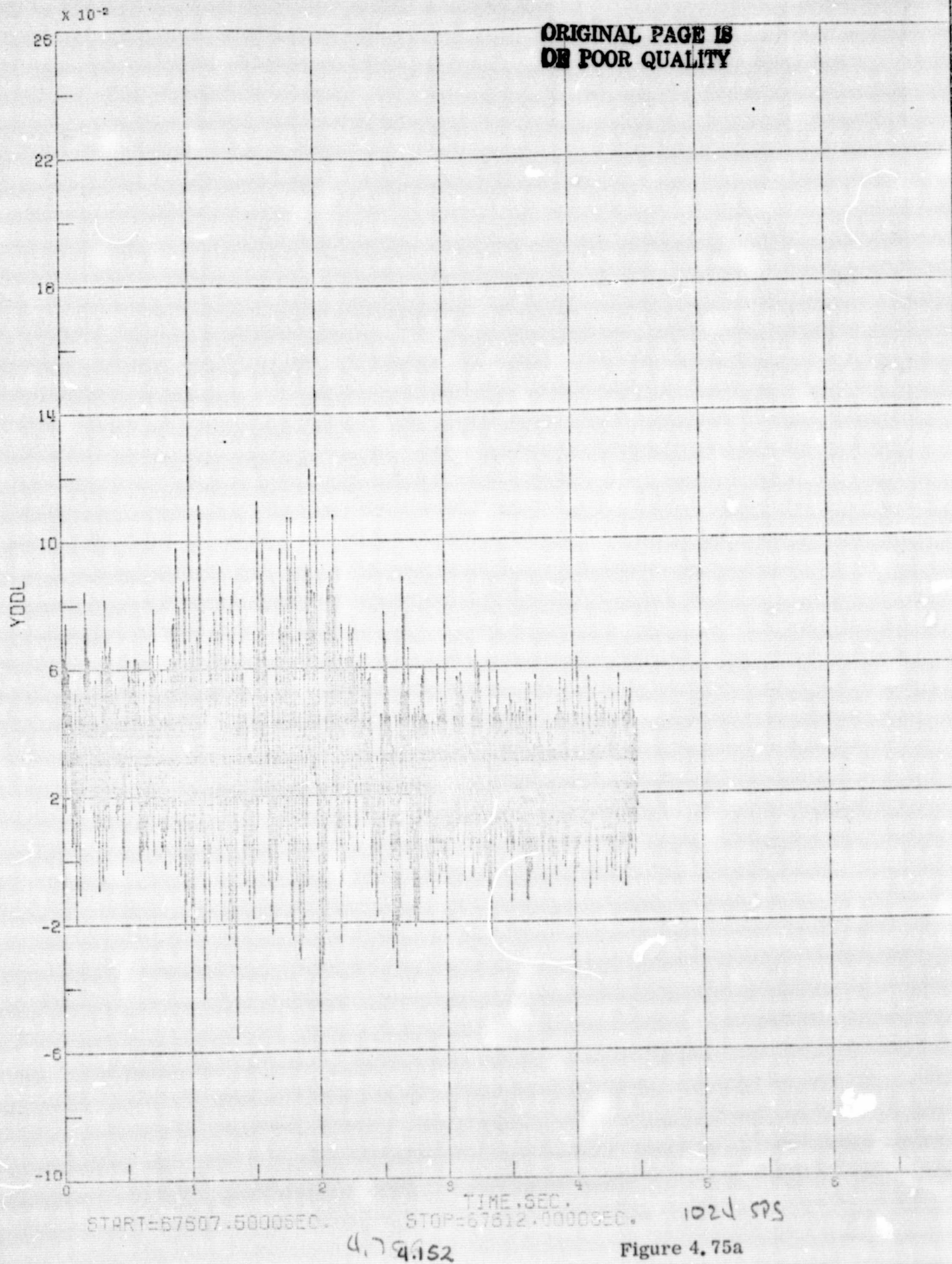
9/

XDDL

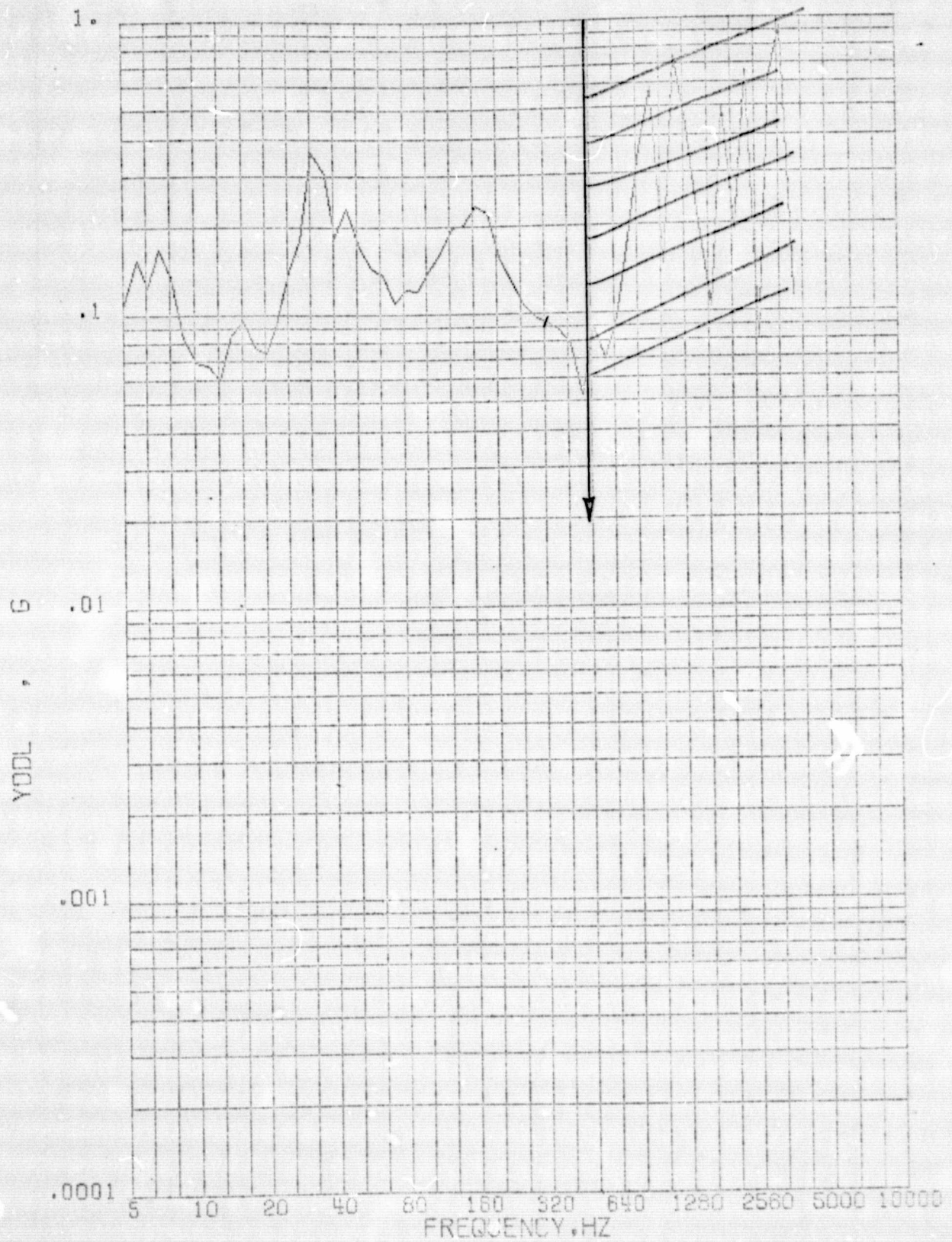
4.151b

Figure 4.74b

ORIGINAL PAGE IS
OF POOR QUALITY



SHOCK SPECTRUM



START=67608.2000SEC.

STOP=67612.0000SEC.

G=10.

VIKING 8

ST G 2 BO(GRI)

1024 SPS

S/

YDDL

4.153 b

Figure 4.75b

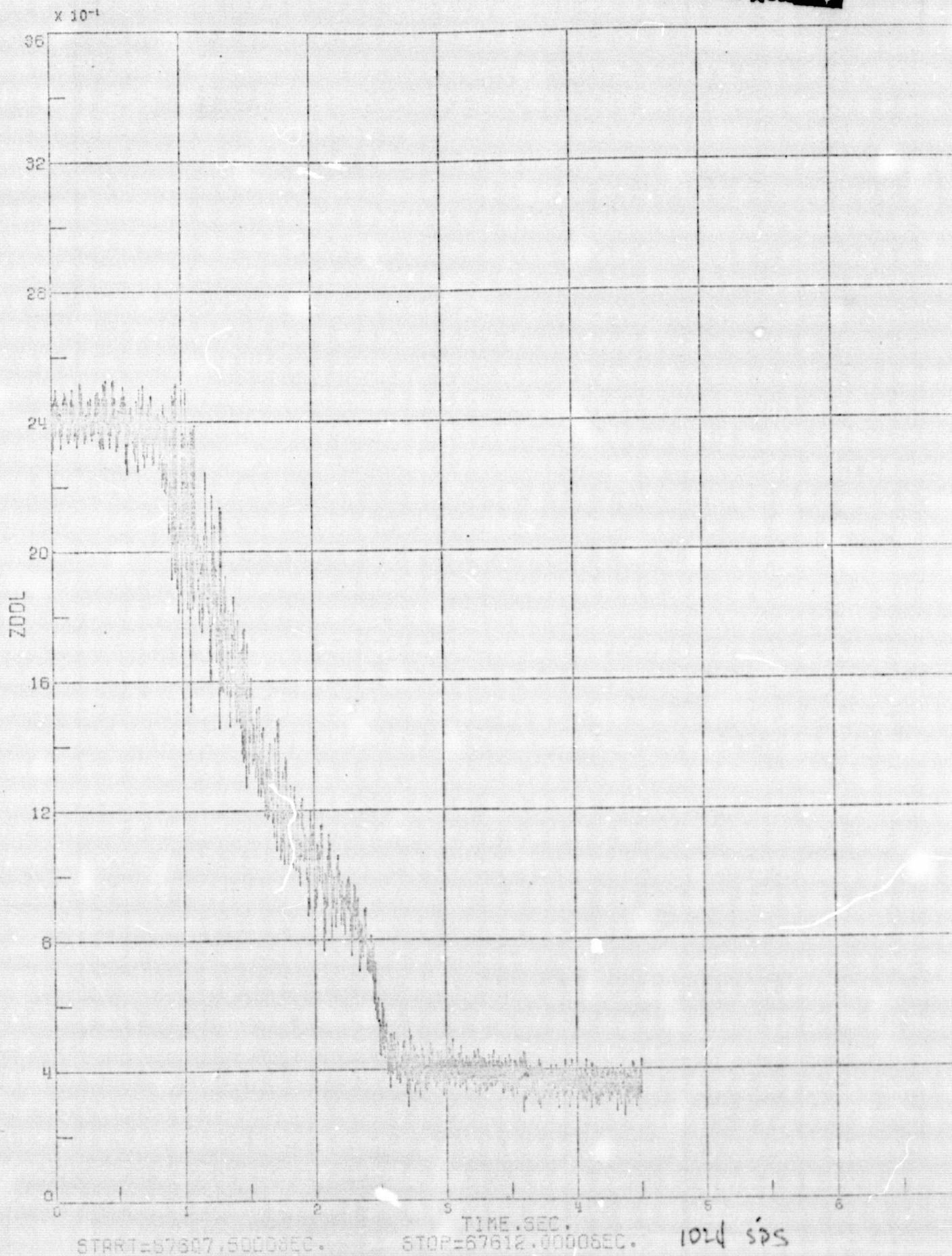
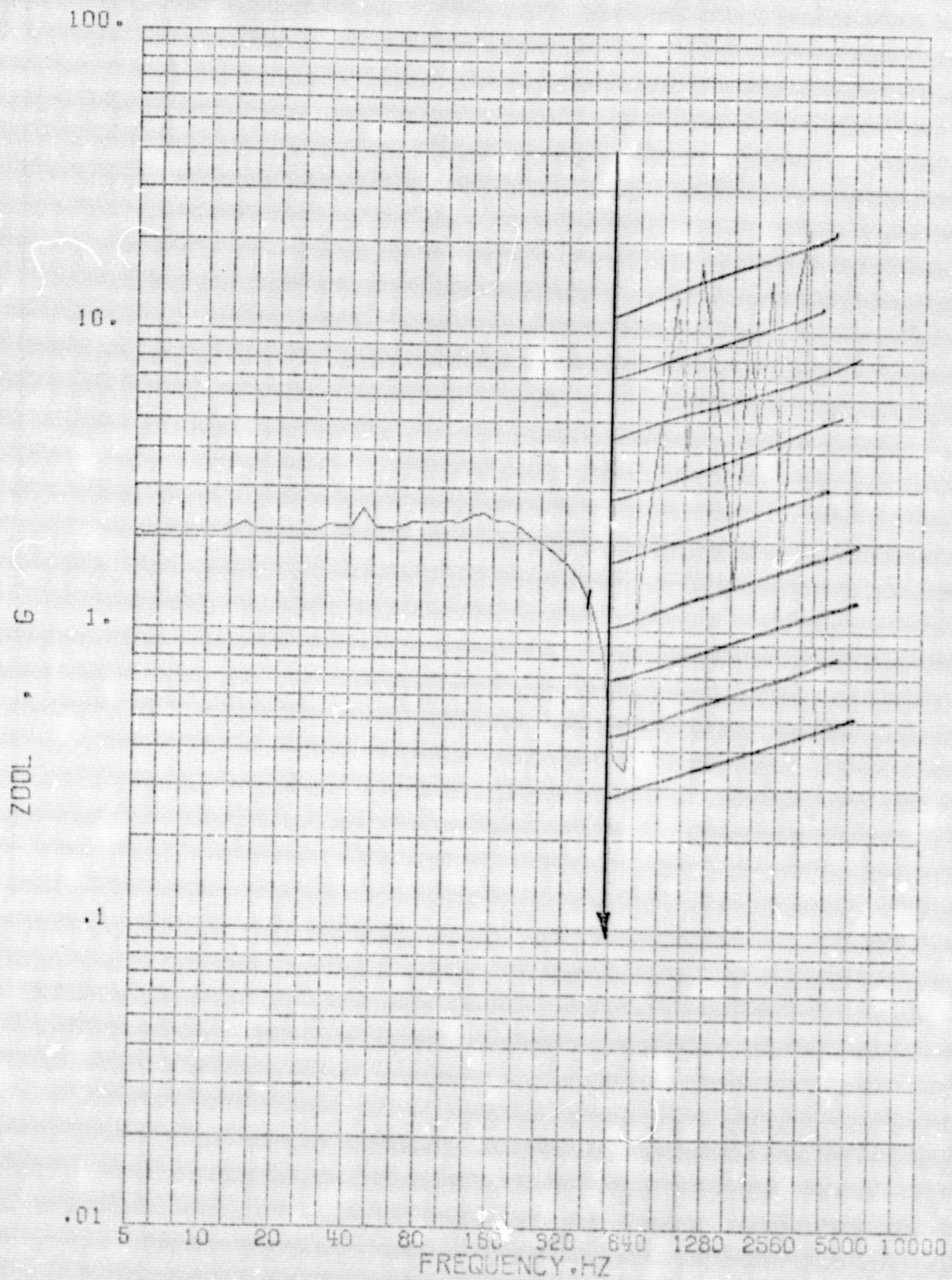


Figure 4.76a

SHOCK SPECTRUM



START=67608.2000SEC.

STOP=67612.0000SEC.

Q=10.

VIKING B

ST G 2 80(GBL)

1024 SPS

9/

ZDDL

4.155

Figure 4. 76b

ORIGINAL PAGE IS
OF POOR QUALITY

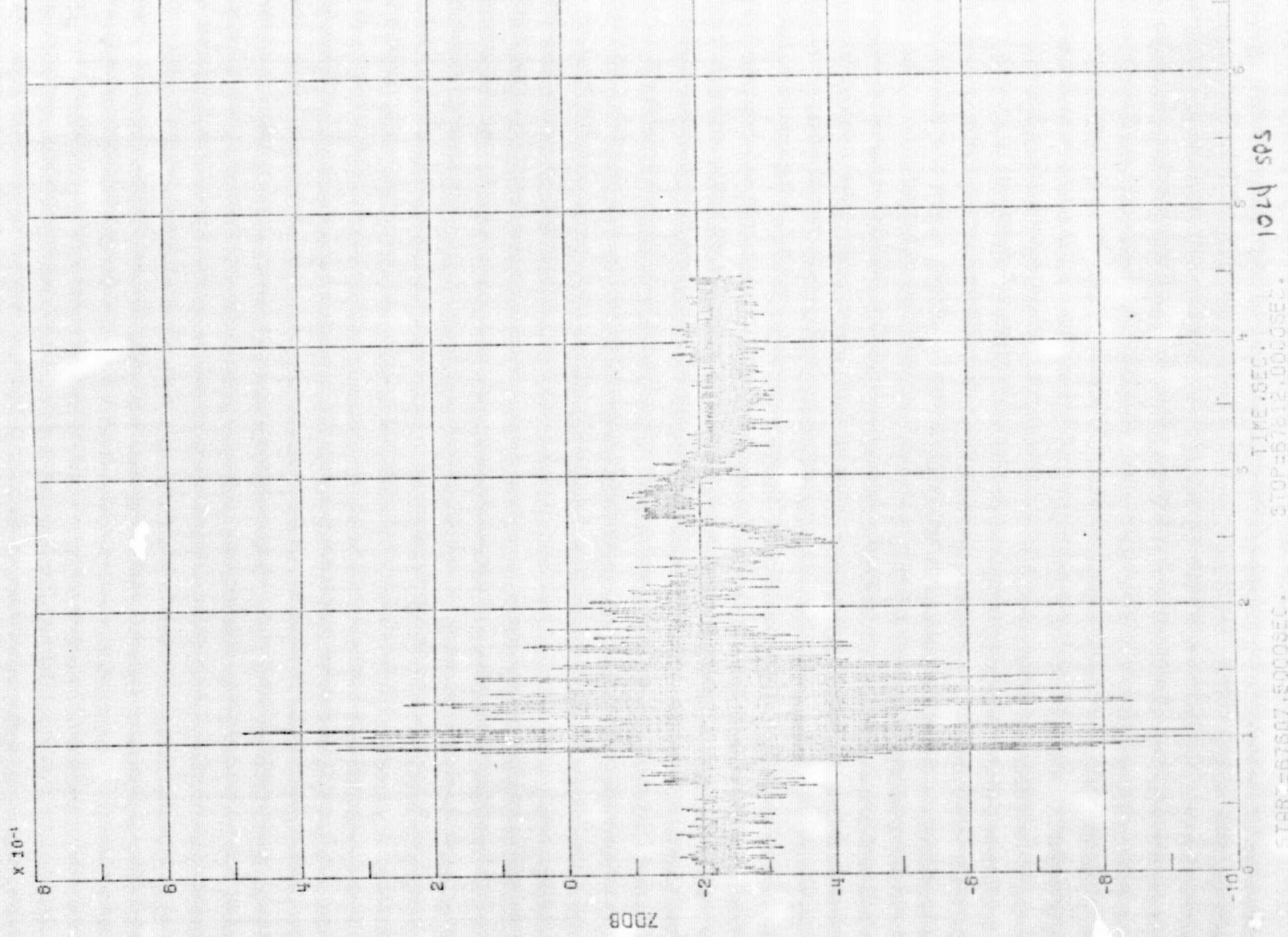
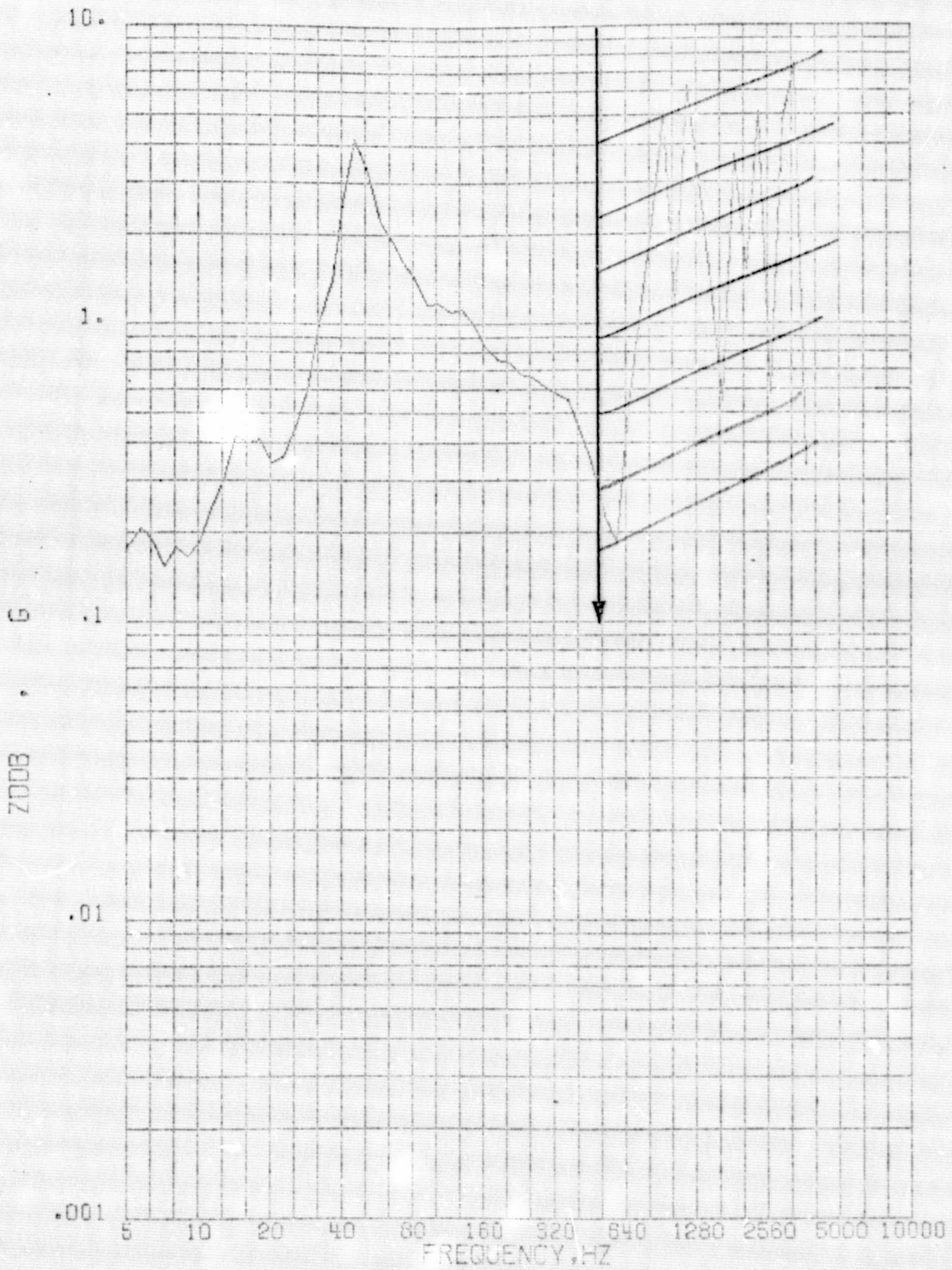


Figure 4.77a

SHOCK SPECTRUM



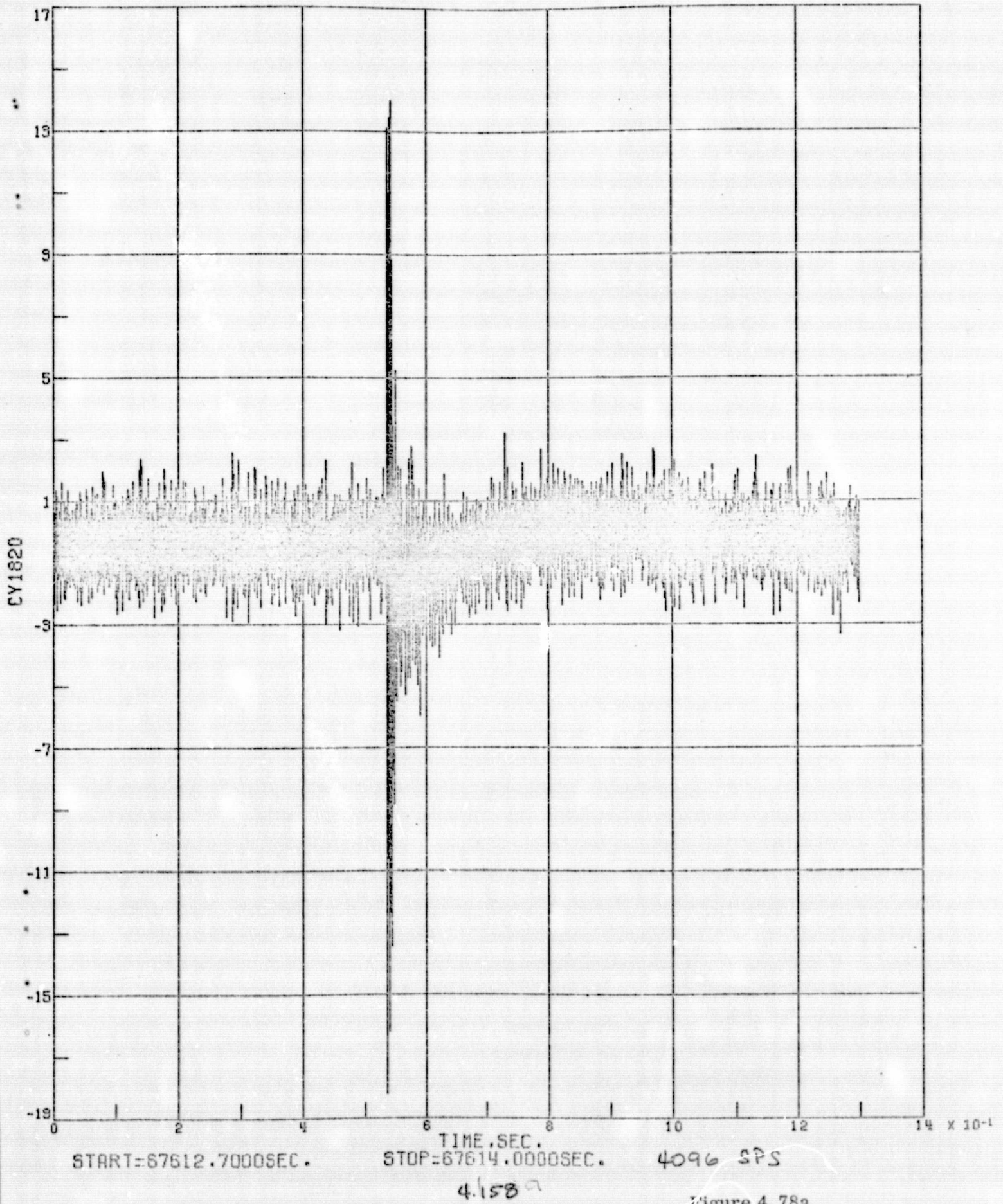
START=67608.2000SEC. STOP=67612.0000SEC. Q=10.

VIKING B ST G 2 80(681) 1024 SPS 9/ 2008

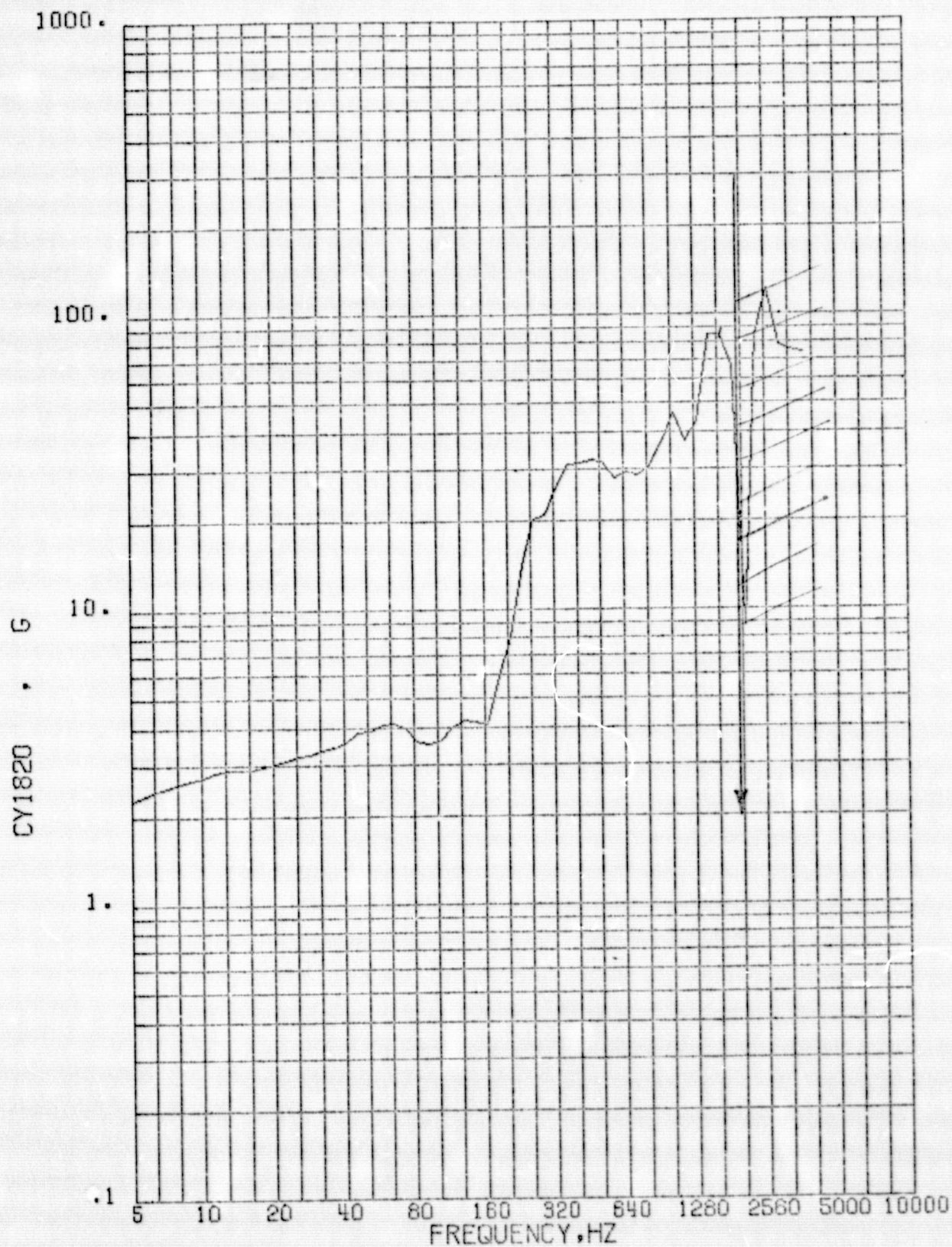
4.77
4.157

Figure 4.77b

ORIGINAL PAGE IS
OF POOR QUALITY



SHOCK SPECTRUM



START=67613.2000SEC. STOP=67614.0000SEC. Q=10.
 VIKING B T/ C SEP (GBI) 4096 SPS 9/ CY1820

4.159136

Figure 4.78b

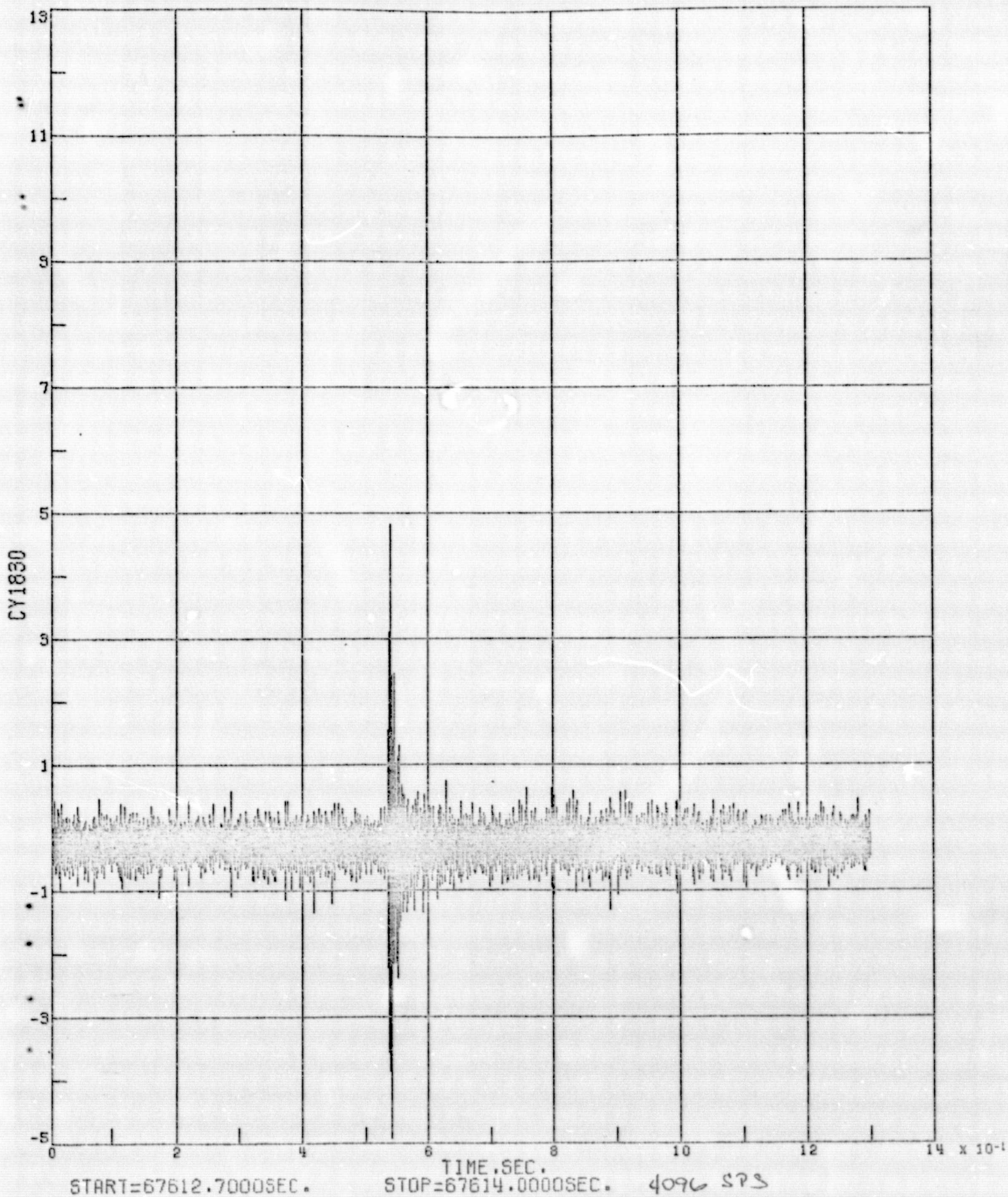
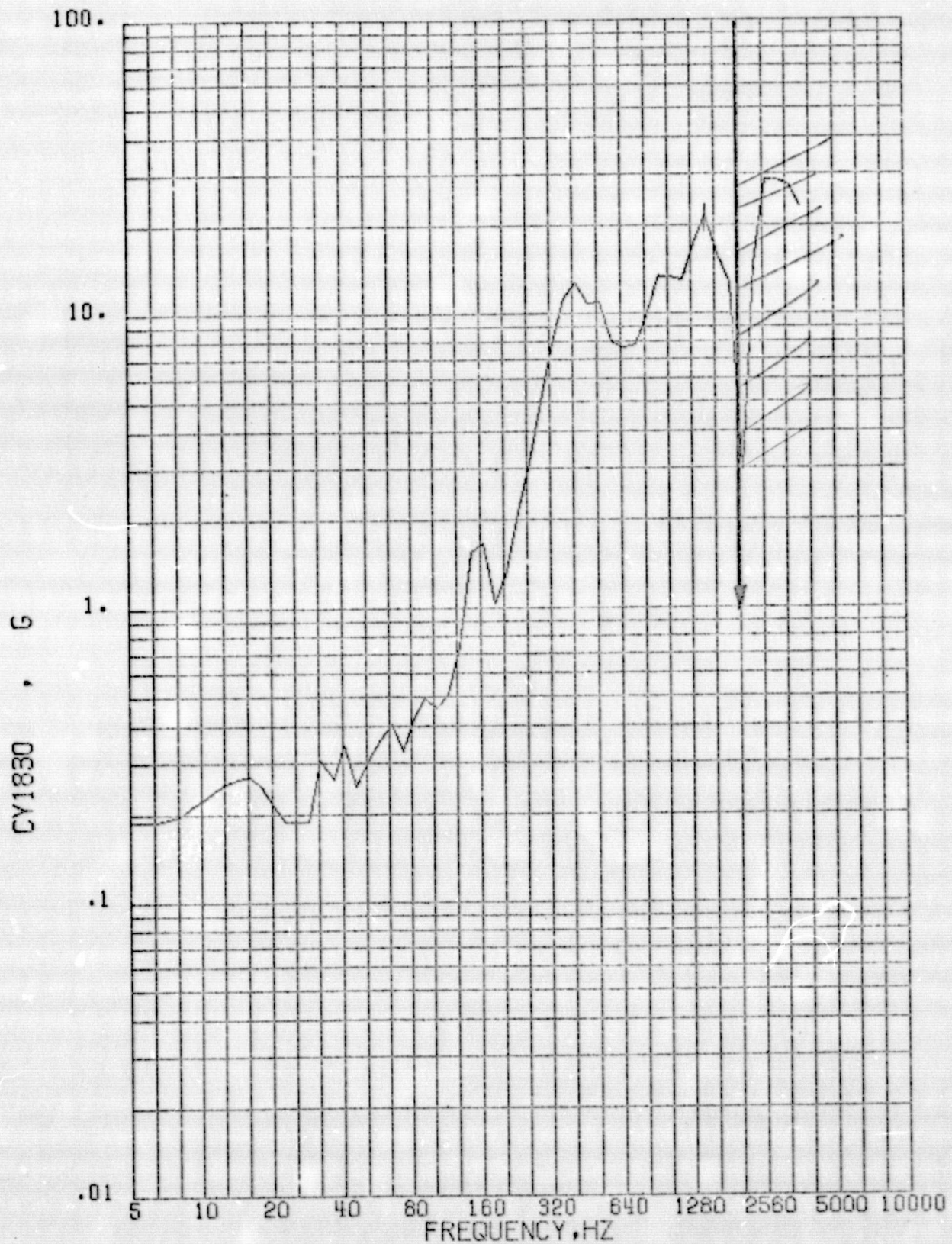


Figure 4. 79a

SHOCK SPECTRUM



START=67613.2000SEC.

STOP=67614.0000SEC.

Q=10.

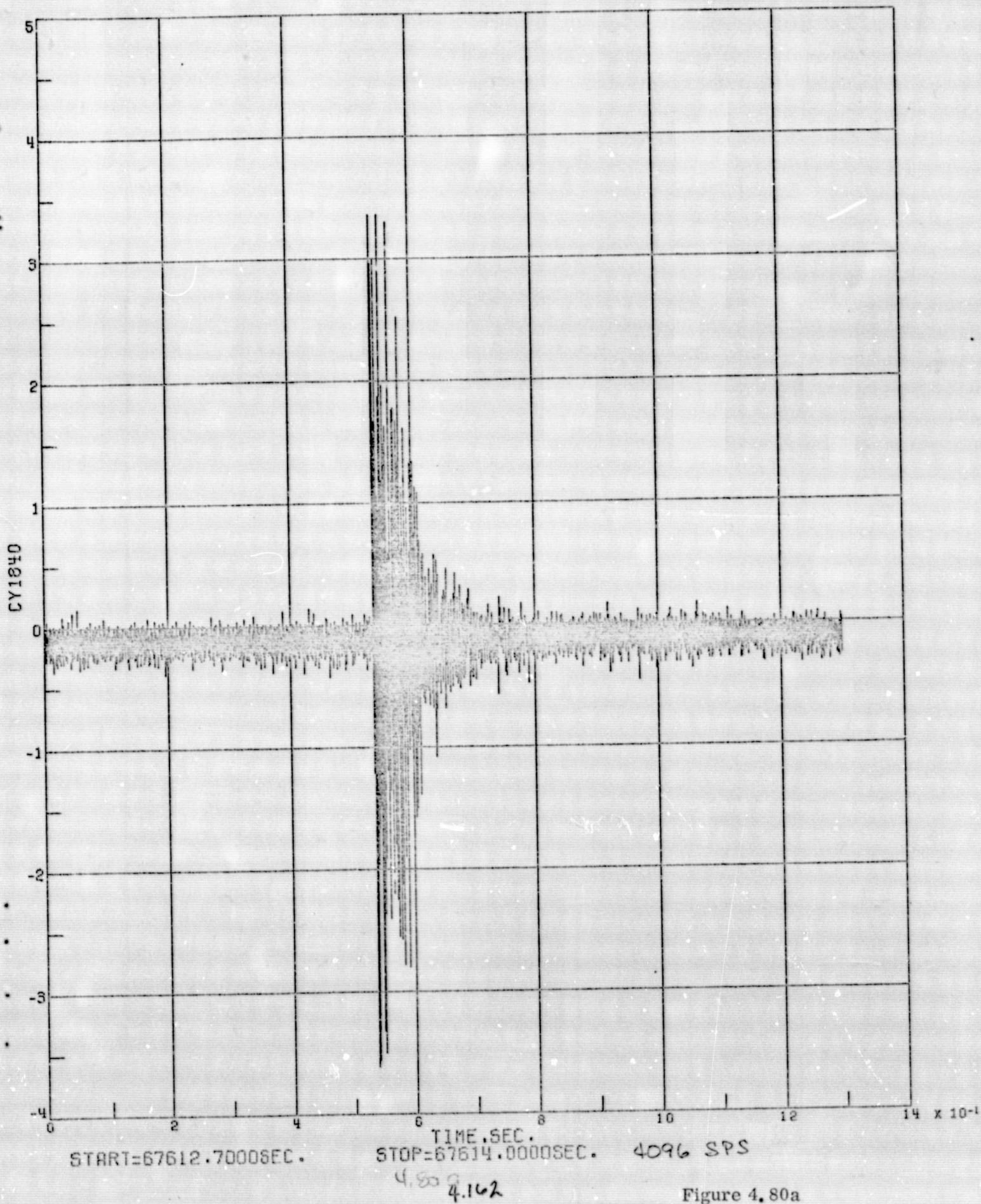
VIKING B

T/C SEP (GBI) 4096 SPS

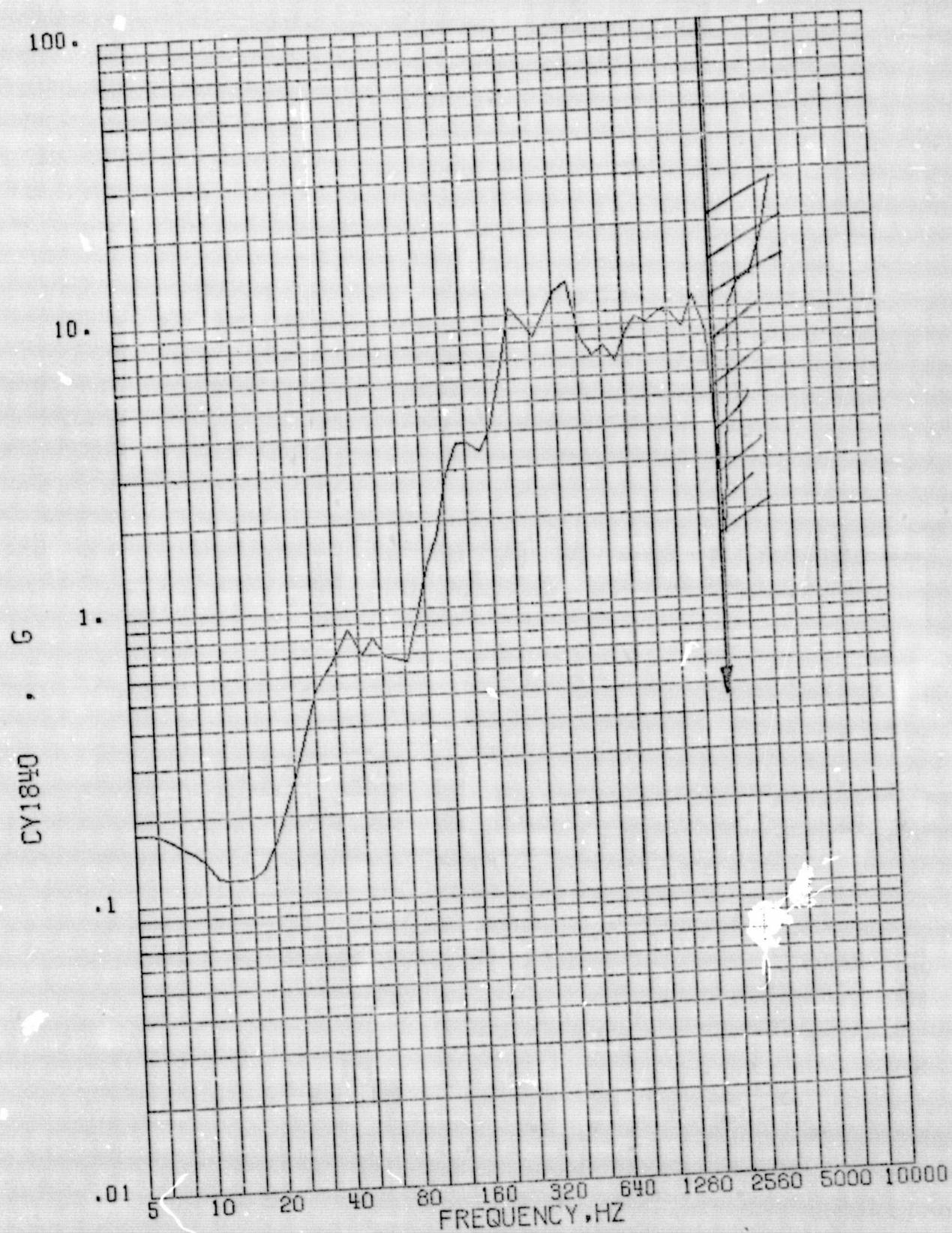
9/ CY1830

4.16p

Figure 4.79b



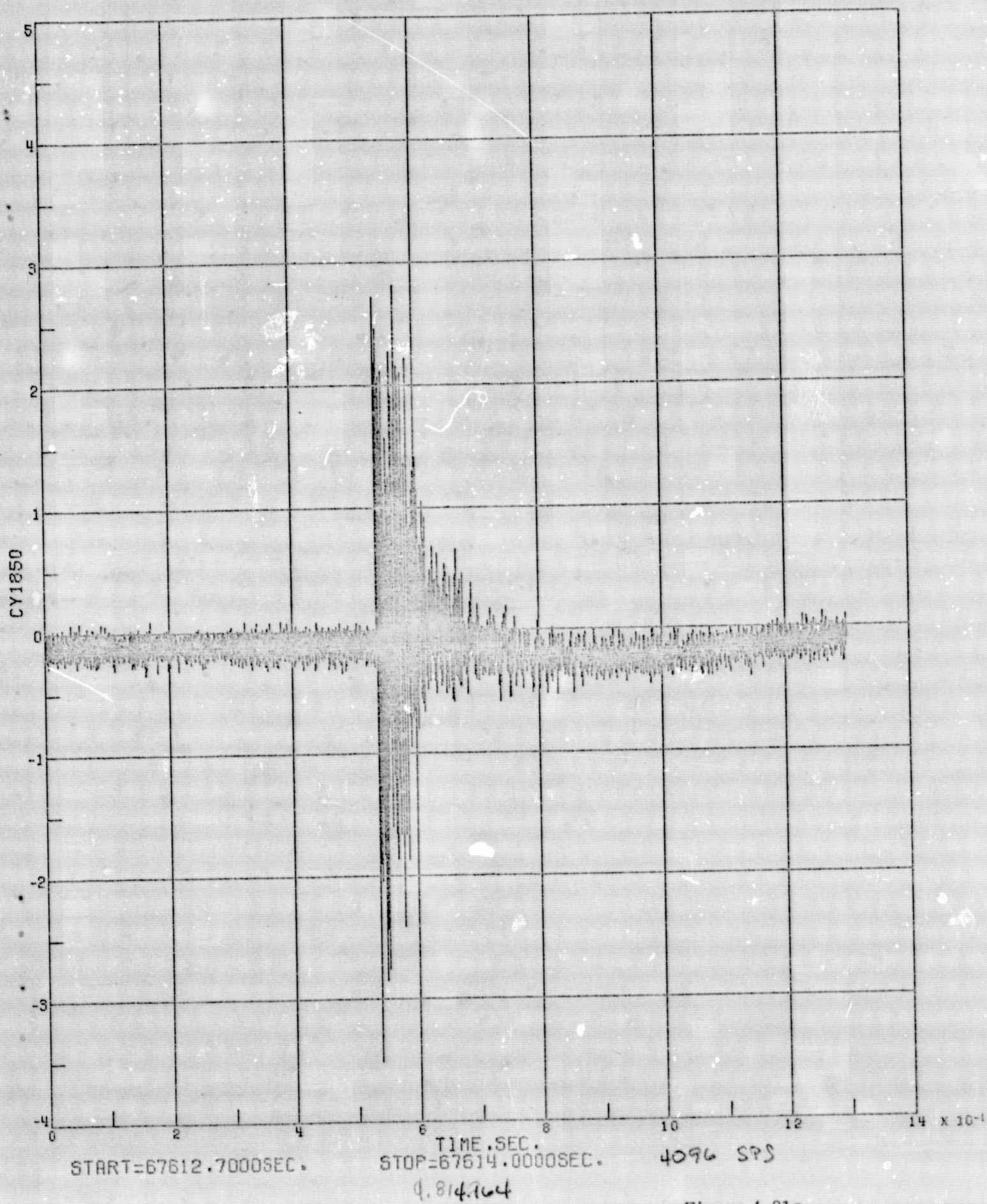
SHOCK SPECTRUM



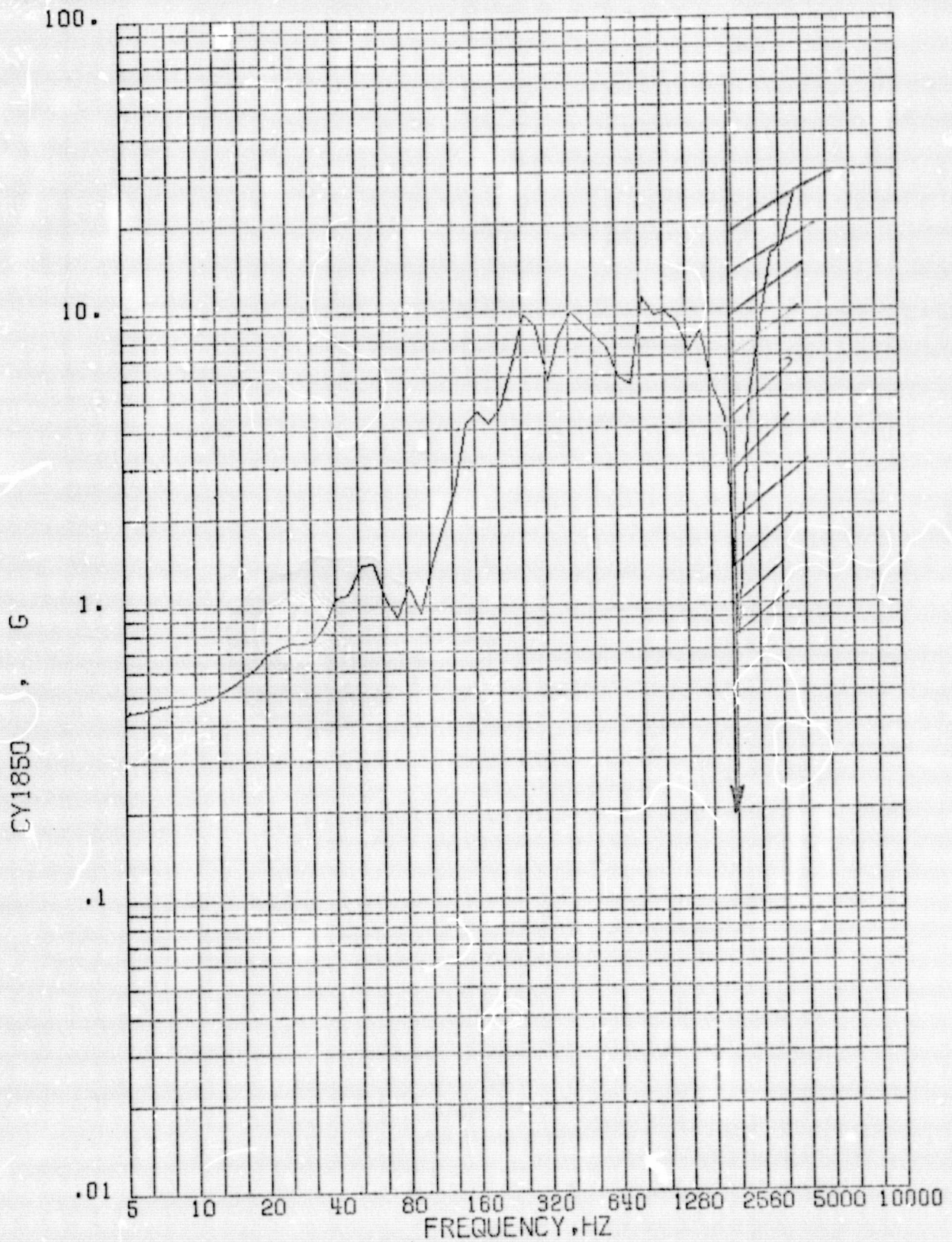
START=67613.2000SEC. STOP=67614.0000SEC. Q=10.
 VIKING B T/ C SEP (GBI) 4096 (SPS) 9/ CY1840

4.80 to 4.163

Figure 4.80b



SHOCK SPECTRUM



START=67613.2000SEC.

STOP=67614.0000SEC.

Q=10.

VIKING B

T/ C SEP (GBI)

4096 SPS

9/ CY1850

4.814.165

Figure 4.81b

ORIGINAL PAGE IS
OF POOR QUALITY

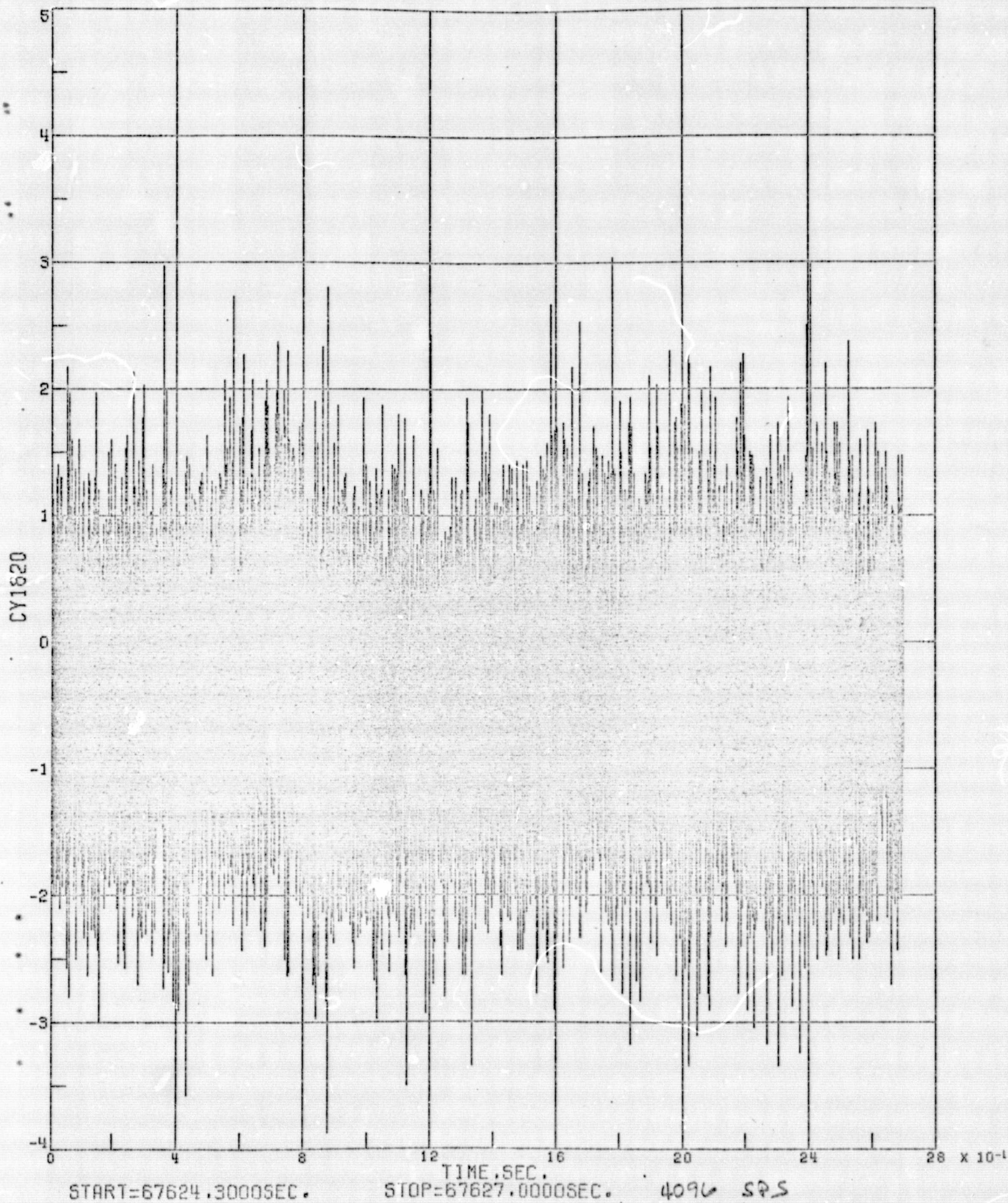
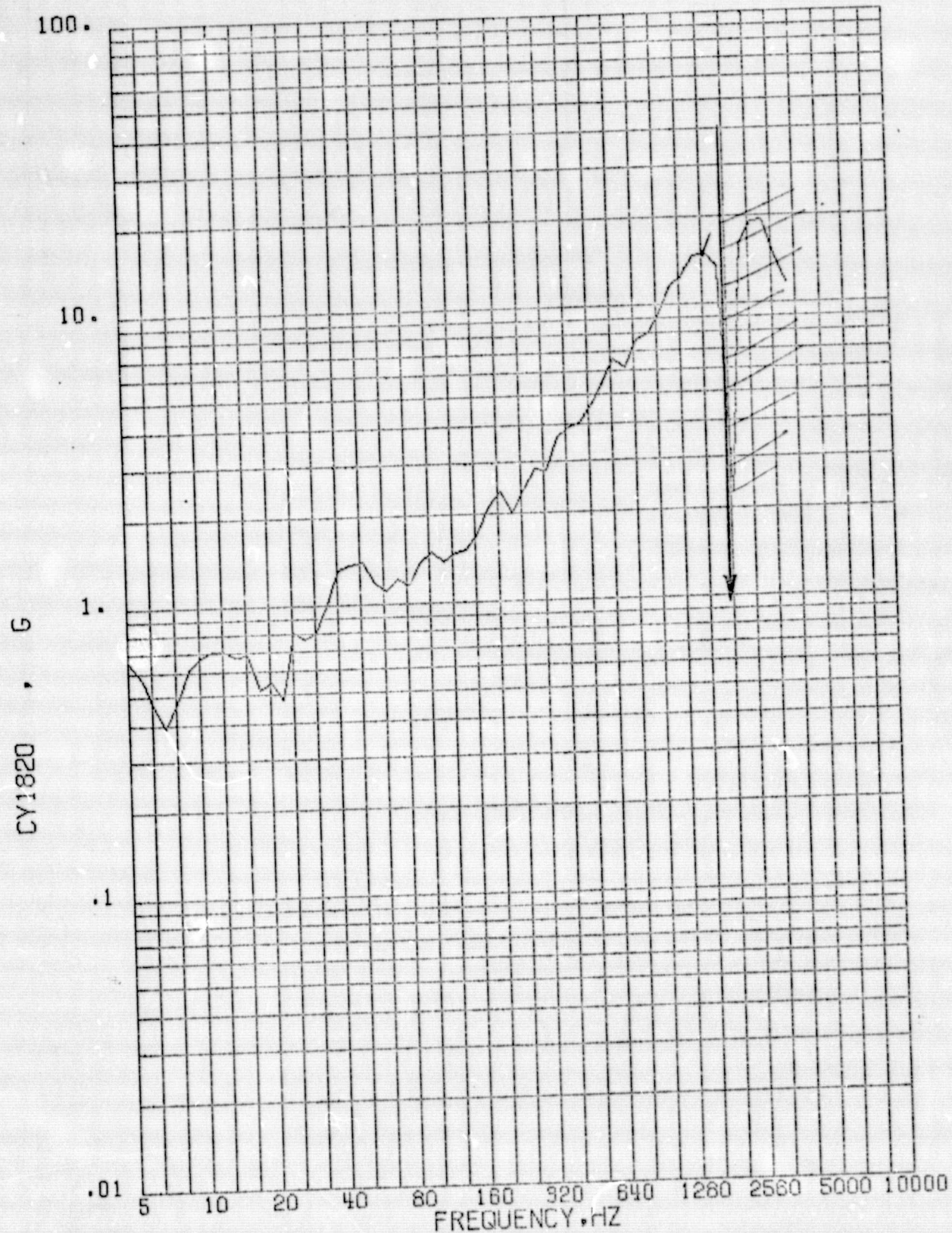


Figure 4.82a

SHOCK SPECTRUM

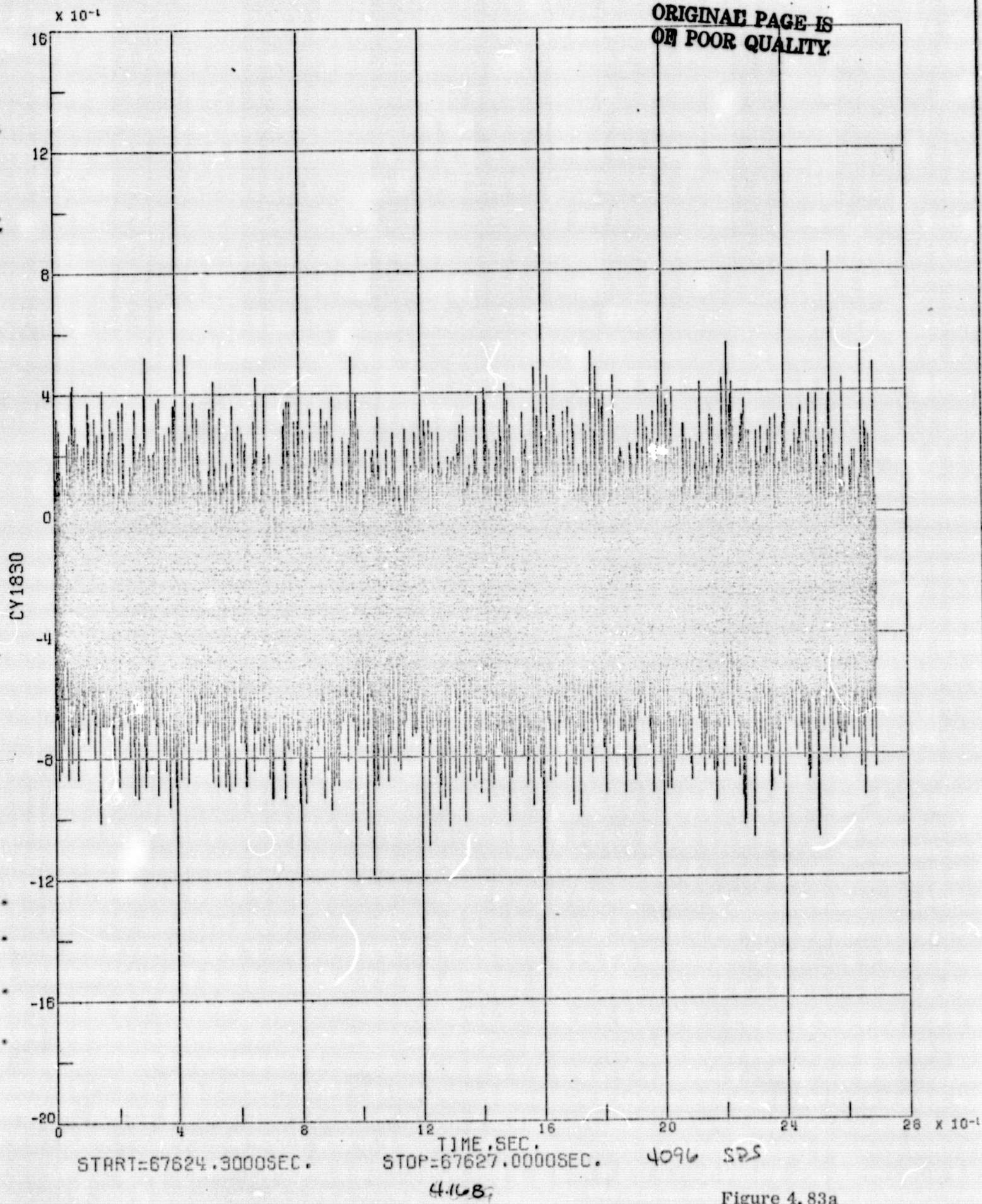


START=67624.8000SEC. STOP=67627.0000SEC. Q=10.
 VIKING B ME S 1 (GBI) 4096 SPS 9/ CY1820

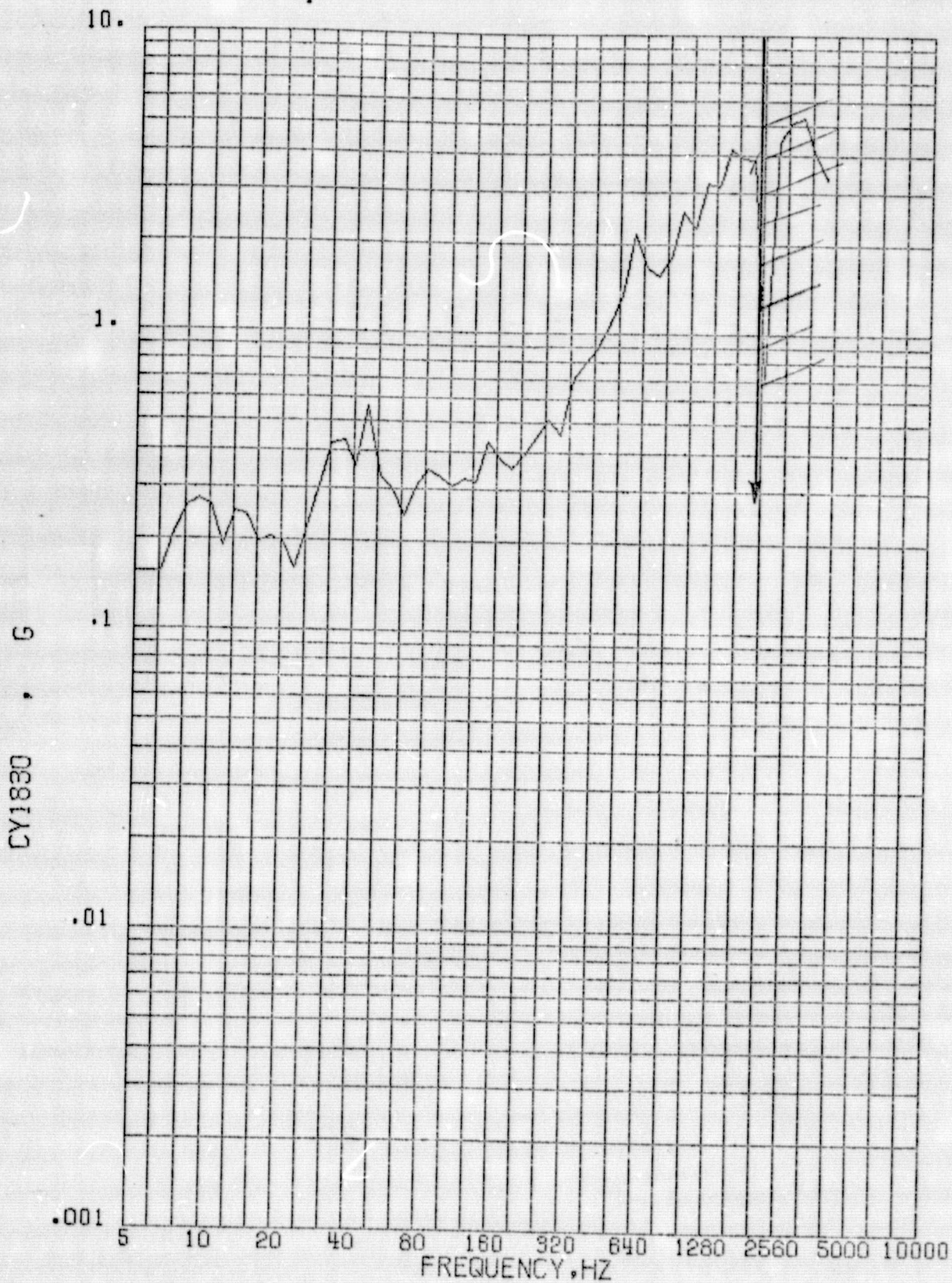
4.167b

Figure 4.82b

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OF POOR QUALITY



SHOCK SPECTRUM



START=67624.8000SEC.

STOP=67627.0000SEC.

Q=10.

VIKING B

ME S 1 (GBI)

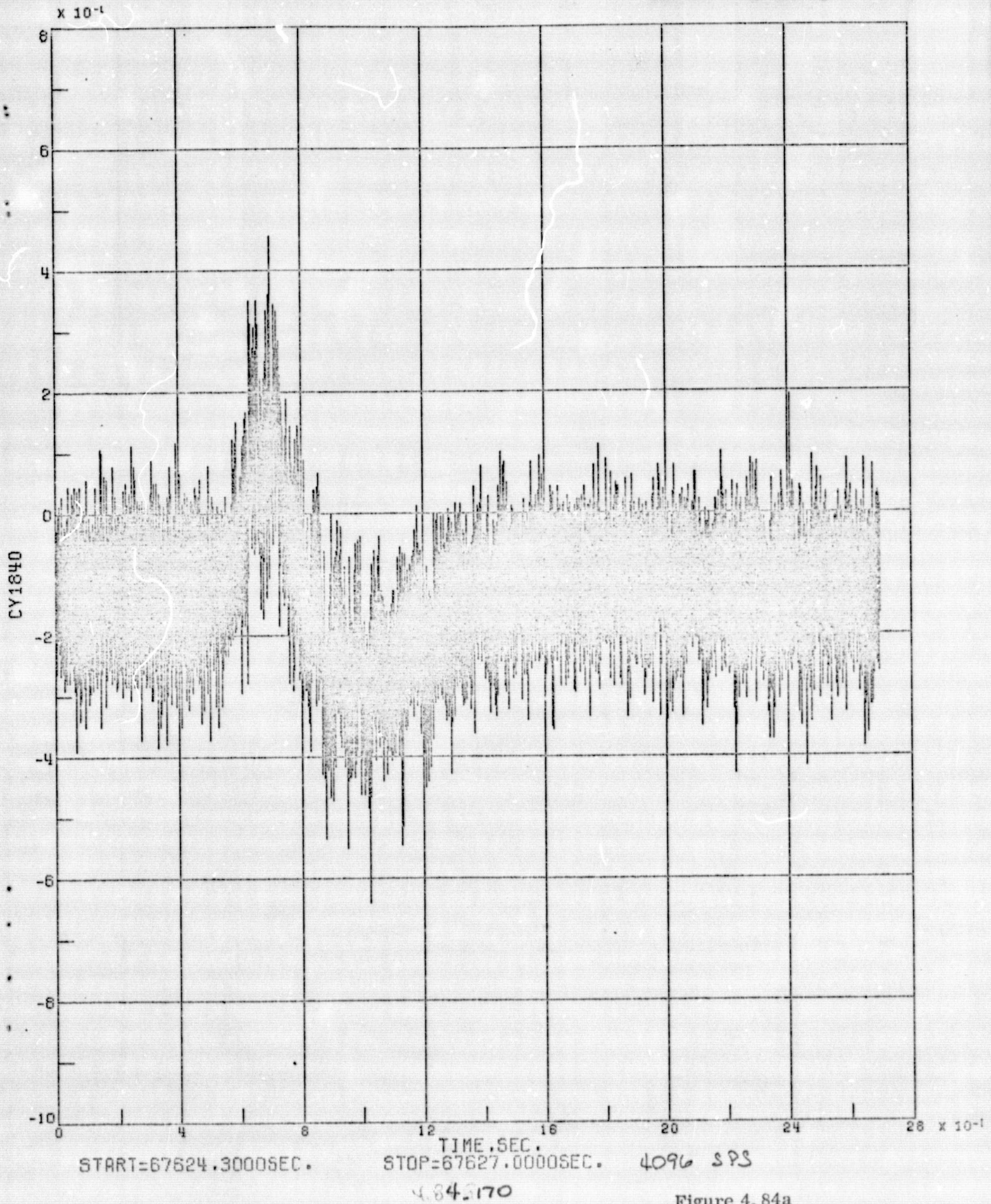
4096 SPS

9/ CY1830

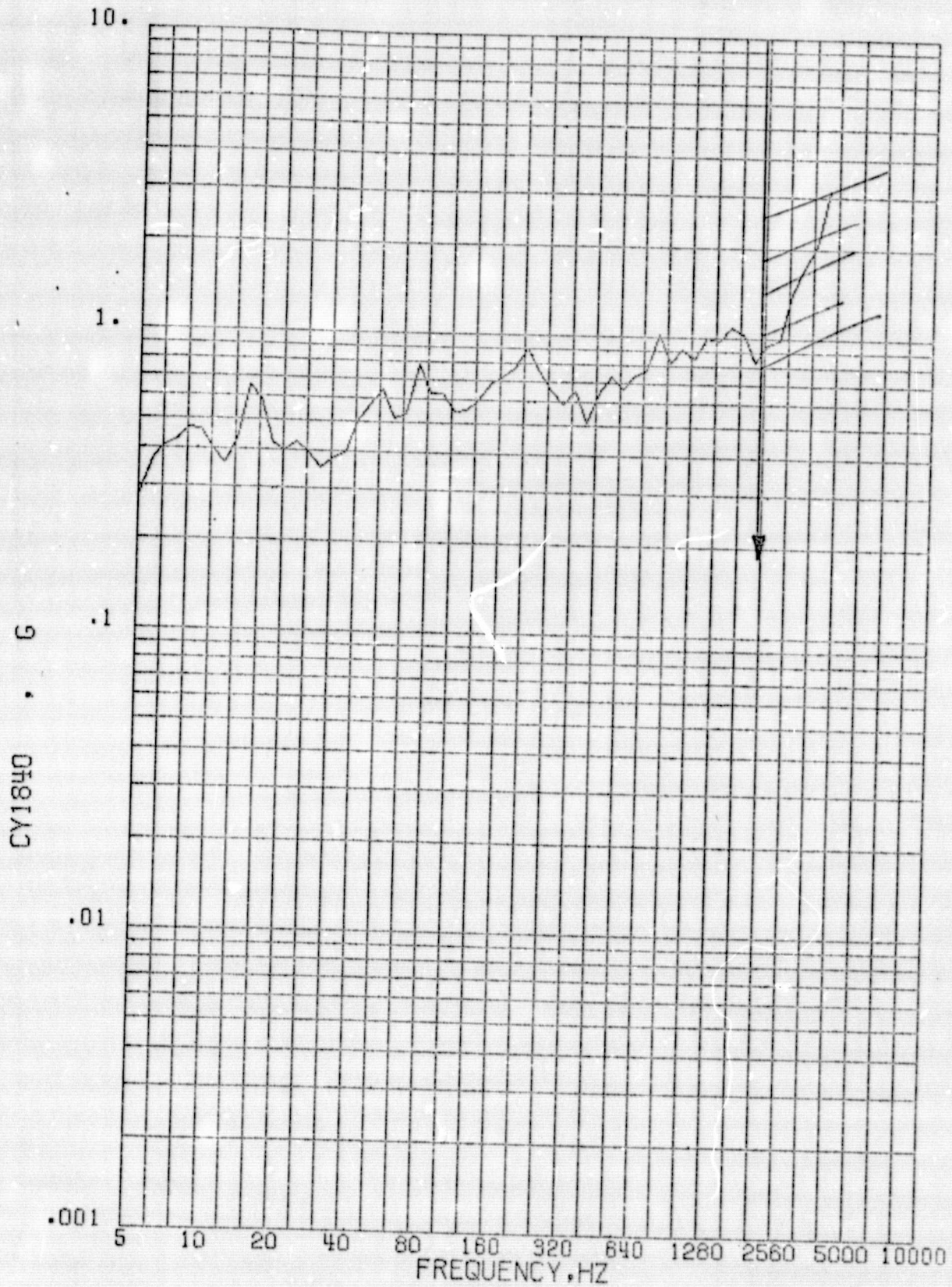
4.16936

Figure 4. 83b

ORIGINAL PAGE IS
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SHOCK SPECTRUM



START=67624.8000SEC.

STOP=67627.0000SEC.

Q=10.

VIKING B

ME S 1 (GBI)

4096 SPS

9/ CY1840

(1.2.171)

Figure 4.84b

ORIGINAL PAGE IS
OF POOR QUALITY

CY1850

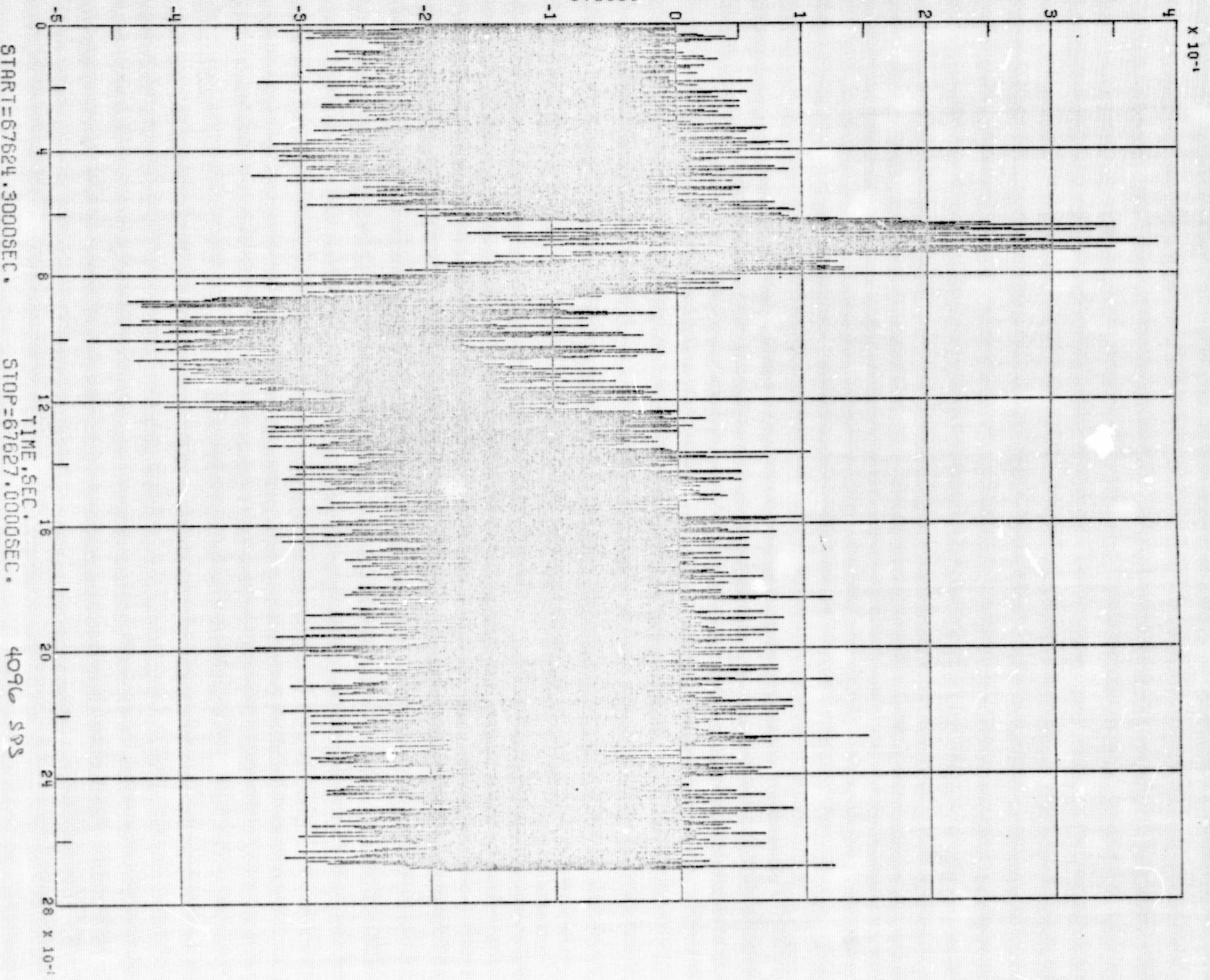
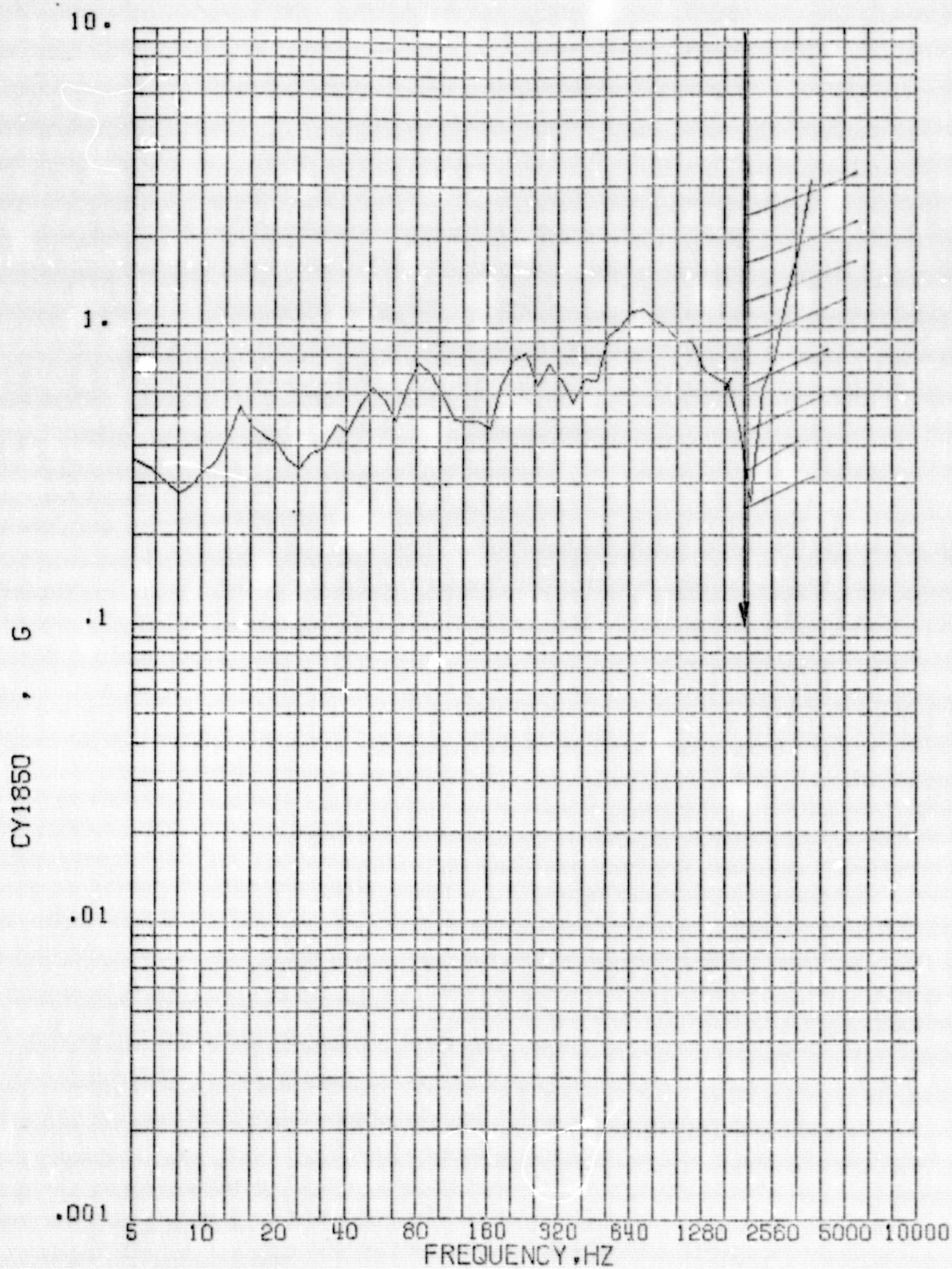


Figure 4.85a

SHOCK SPECTRUM



START=67624.8000SEC. STOP=67627.0000SEC. Q=10.
 VIKING B ME S 1 (GBI) 4096 SPS 9/ CY1850

4.173

Figure 4.85b

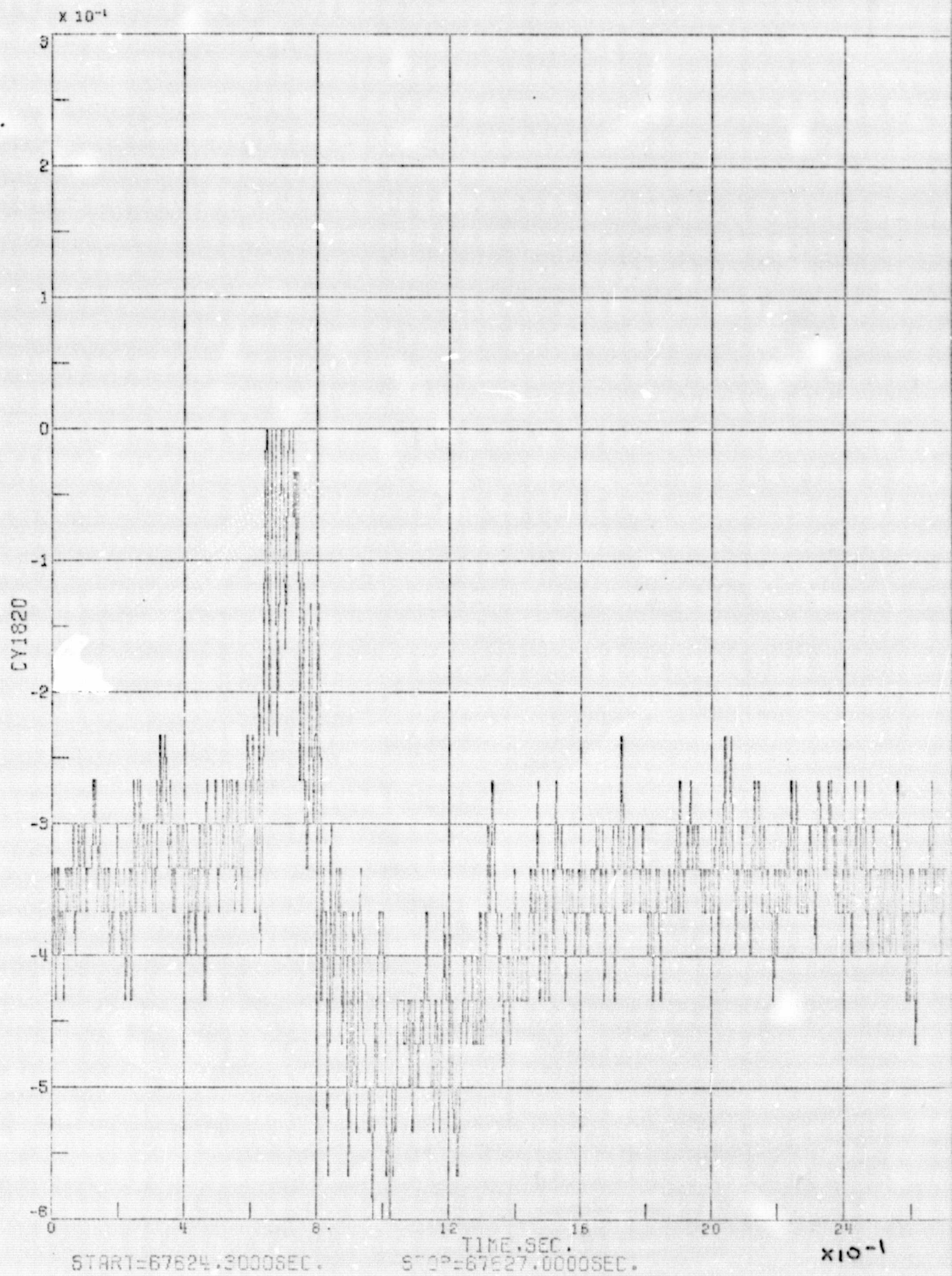
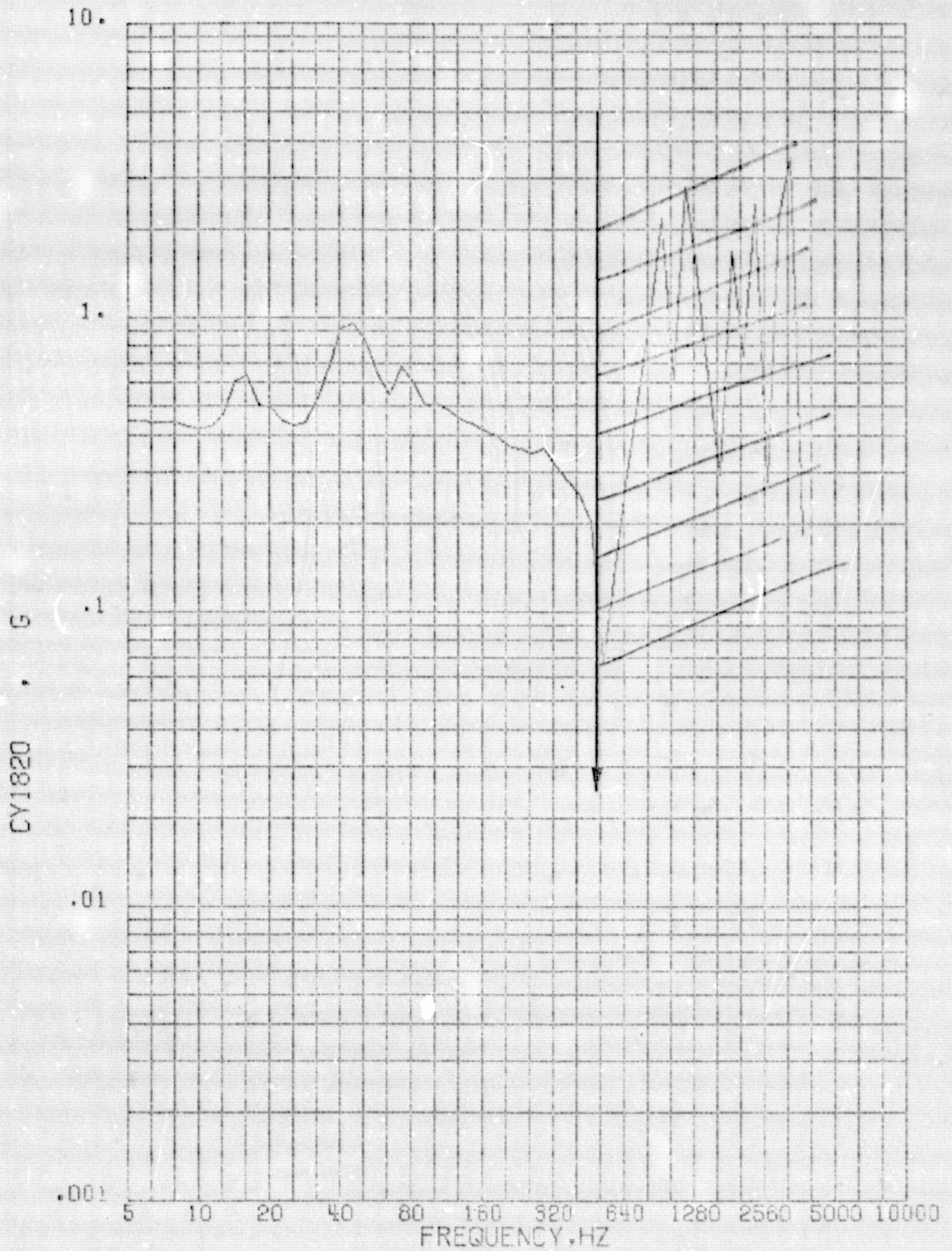


Figure 4, 86a

SHOCK SPECTRUM



START=67624.8000SEC.

STOP=67627.0000SEC.

Q=10.

VIKING B

ME S 116B11

1024

S/ CY1823

4.175

Figure 4. 86b

ORIGINAL PAGE IS
OF POOR QUALITY

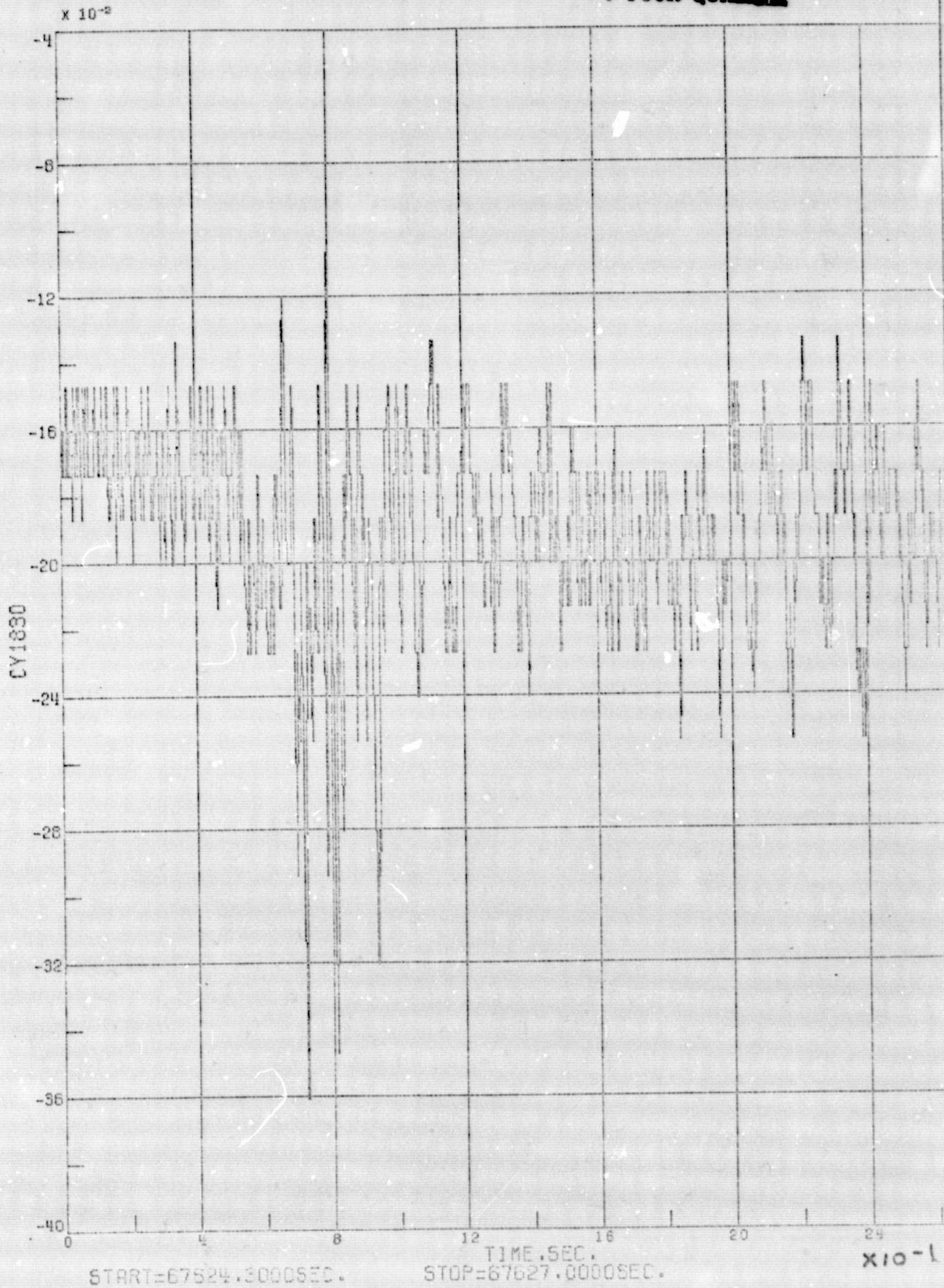
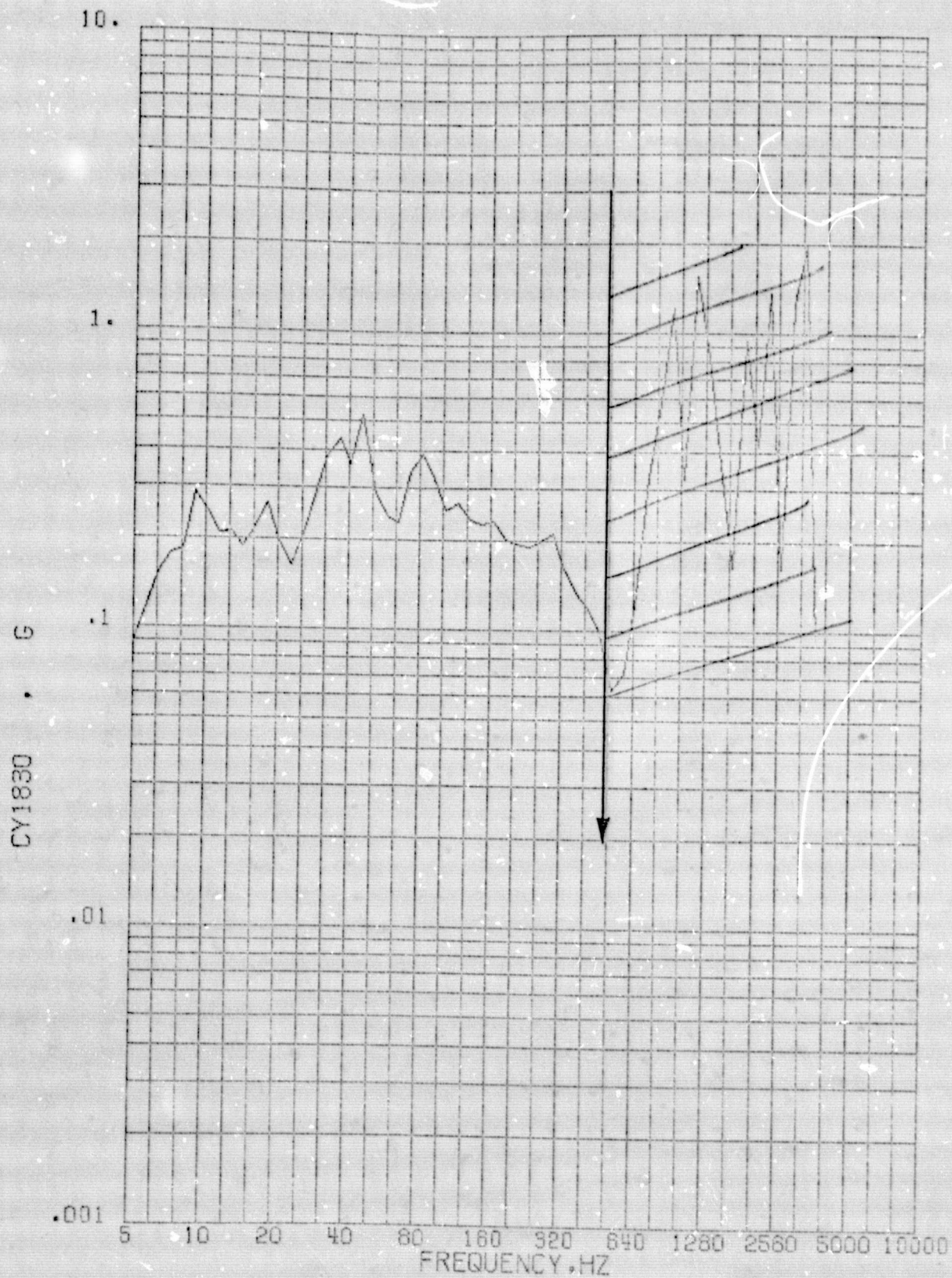


Figure 4.87a

SHOCK SPECTRUM



START=67624.8000SEC.

STOP=67627.0000SEC.

Q=10.

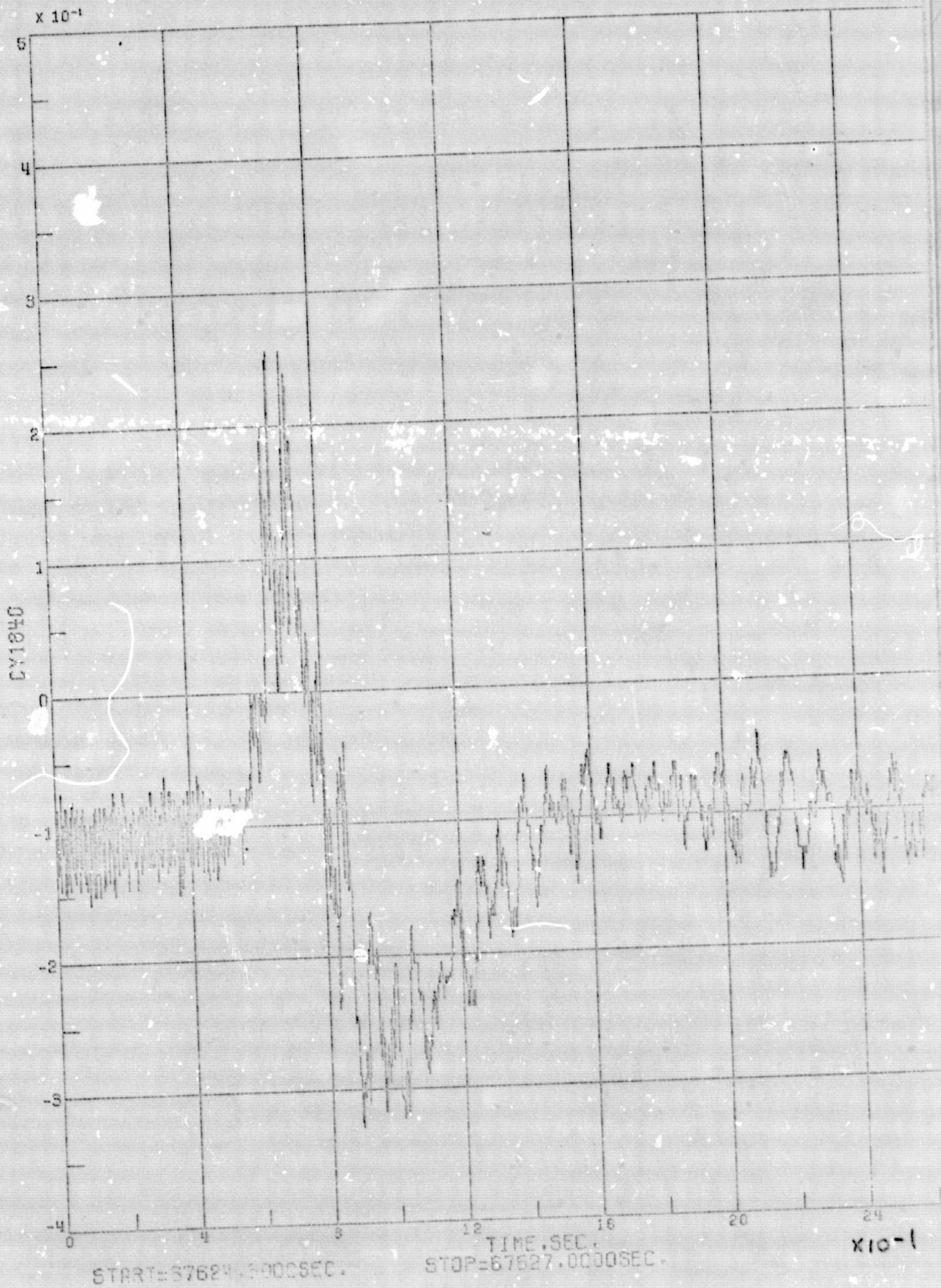
VIKING B

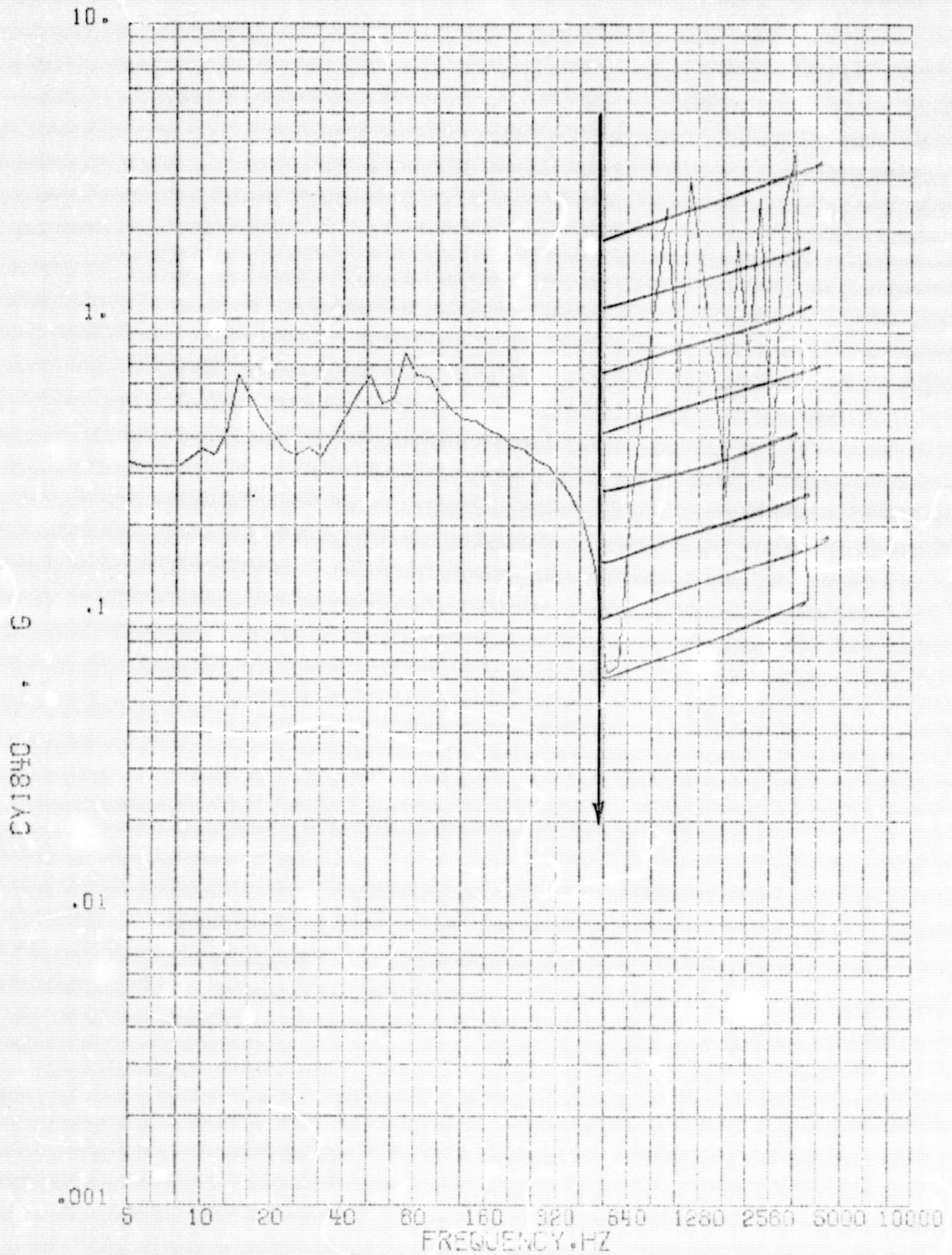
ME 6 1(GBI) 1024

3/ CY1830

4.97
4.177

Figure 4.87b





START=67624.8000SEC.

STOP=67627.0000SEC.

Q=10.

VIKING B

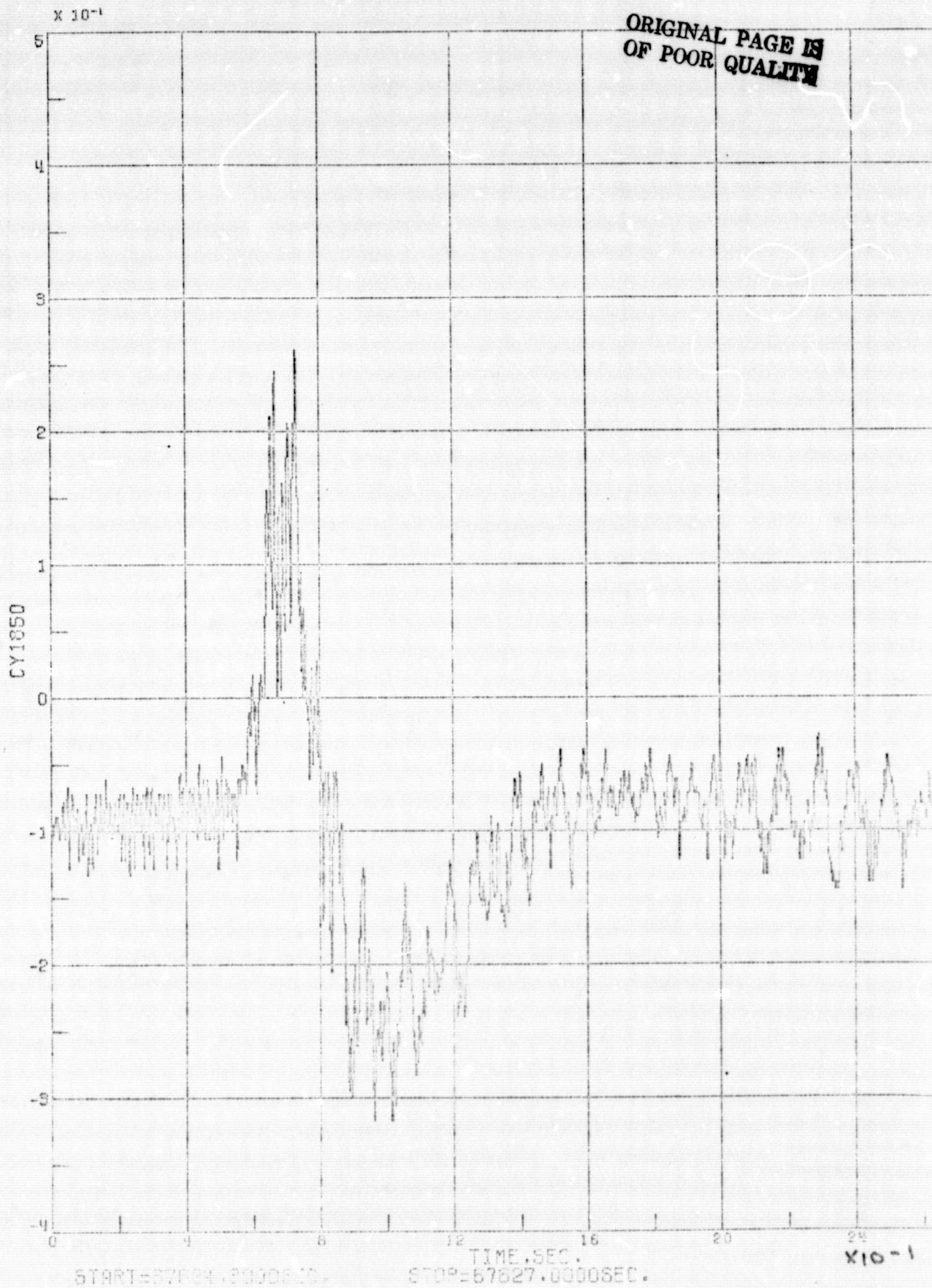
ME S (GBI)

1024

9/ CY1840

4.479

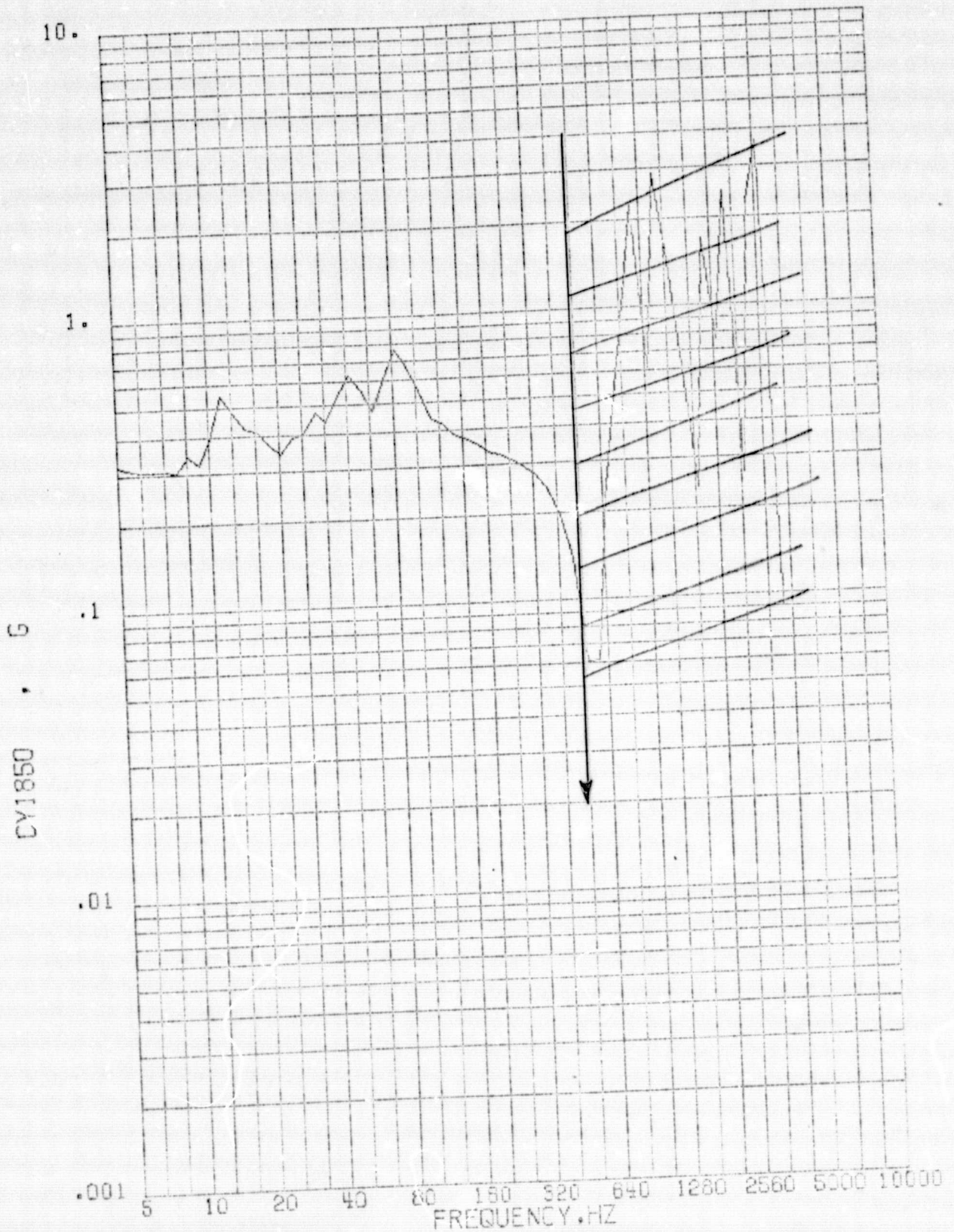
Figure 4.88b



4 4.180

Figure 4.89a

SHOCK SPECTRUM



START=67524.8000SEC. STOP=67627.0000SEC. 0=10.
 VIKING B ME 5 (1631) 1024 9/ CY1850

(4.18)

Figure 4.89b

X 10⁻²

ORIGINAL PAGE IS
OF POOR QUALITY

XDDL

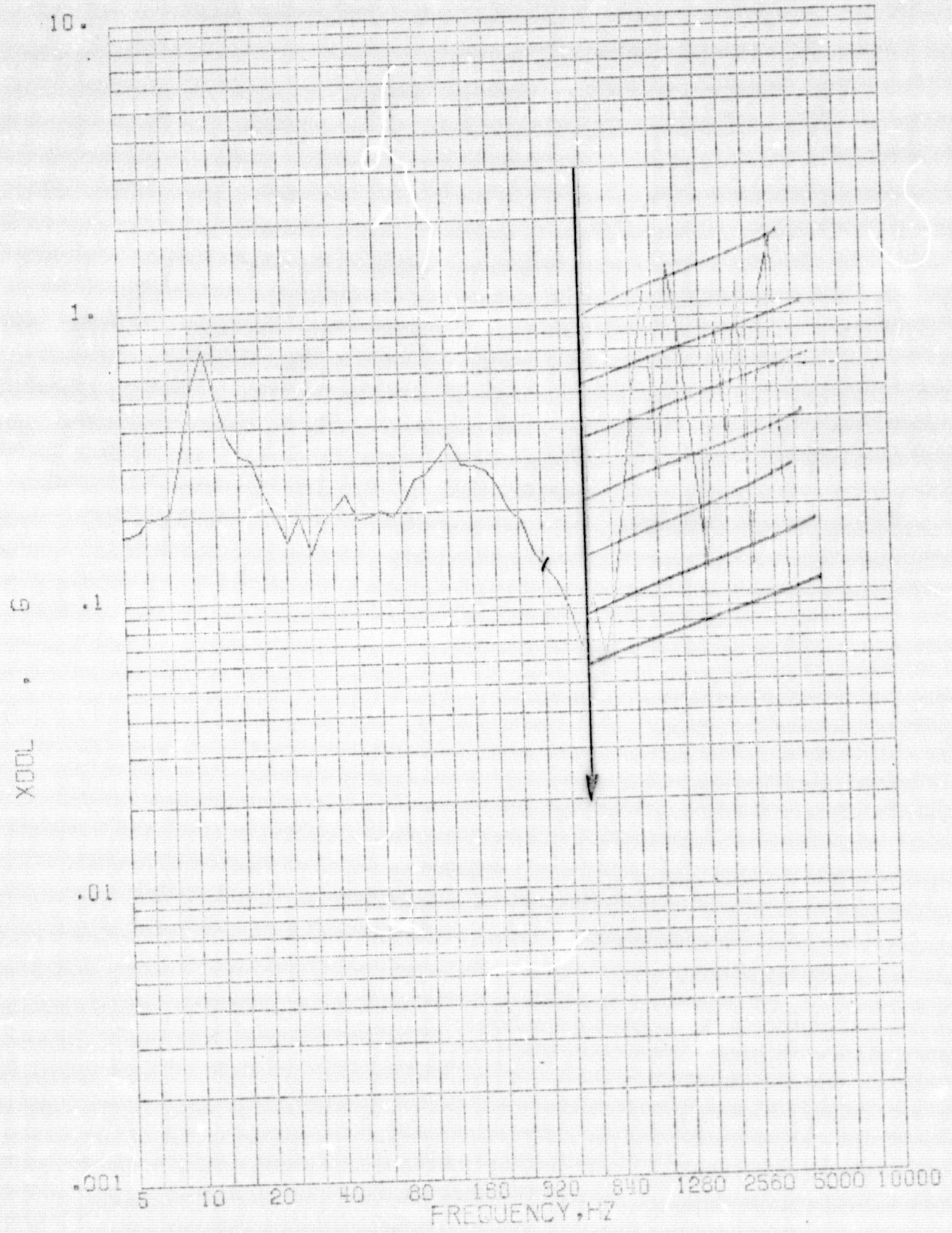
START-67624.0000SEC.

STOP-67627.0000SEC. 1024 SPS

4.182

X10-1

SHOCK SPECTRUM



START=67624.8000SEC. STOP=67627.0000SEC. Q=10.
 VIKING B. ME S 116B11 1014 S2S S/ XDDL

4904.183

Figure 4. 90b

ORIGINAL PAGE IS
OF POOR QUALITY

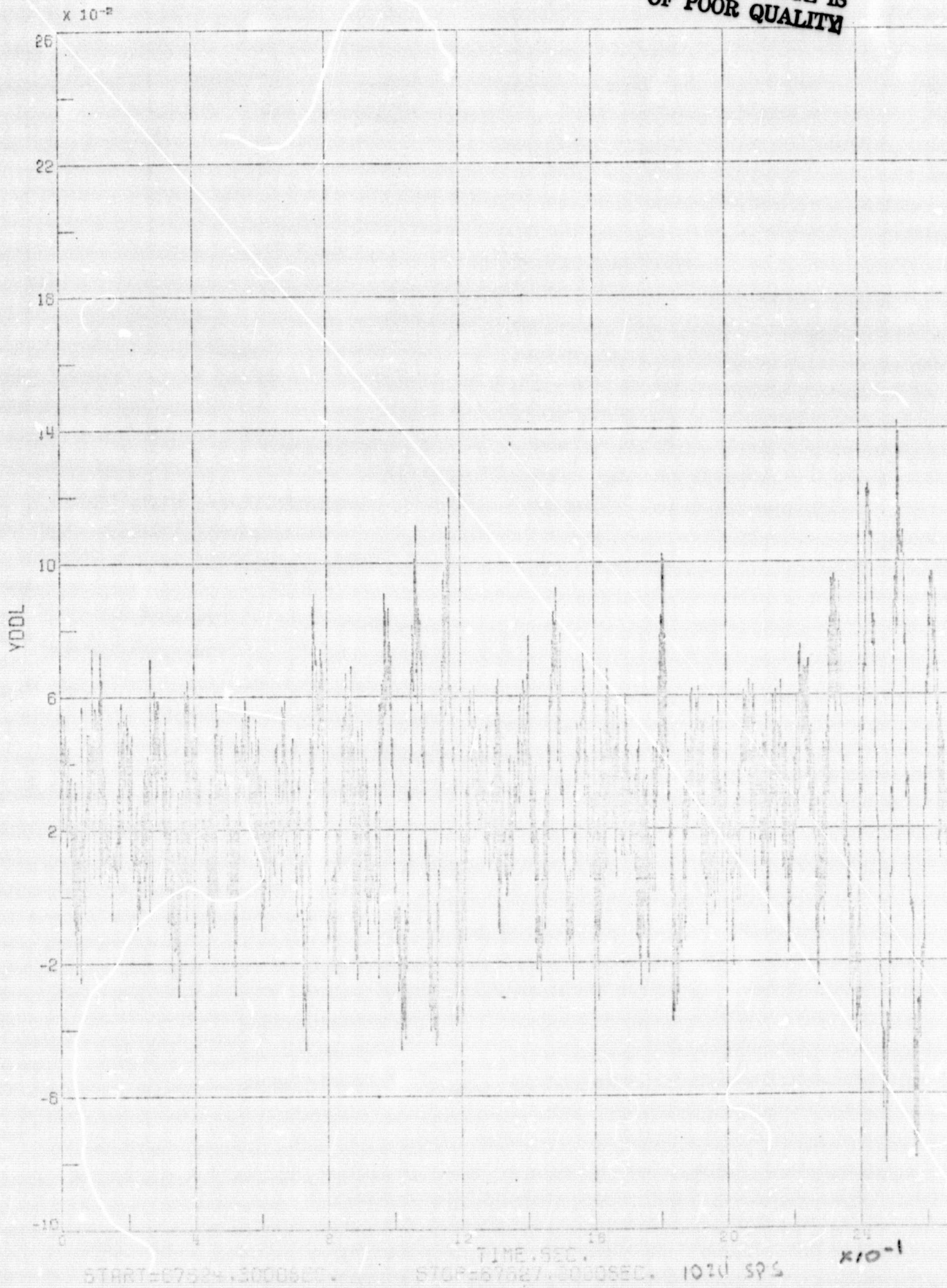
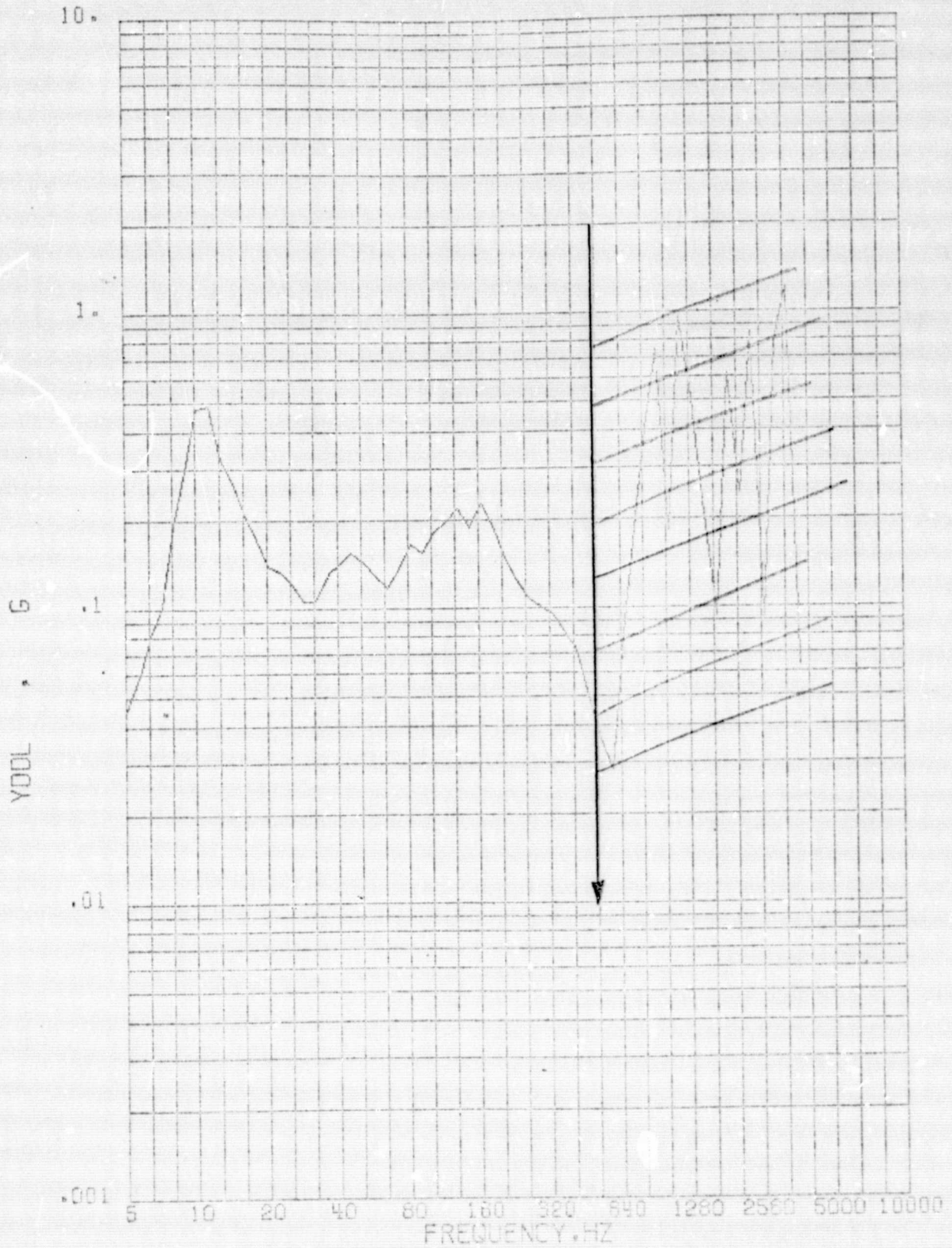


Figure 4. 91a

SHOCK SPECTRUM



START=67624.2000SEC.

STOP=67627.0000SEC.

Q=10.

VIKTING B

ME S (100T)

1024 SPS

97

YDOL

4.916
4.105

Figure 4. 91b

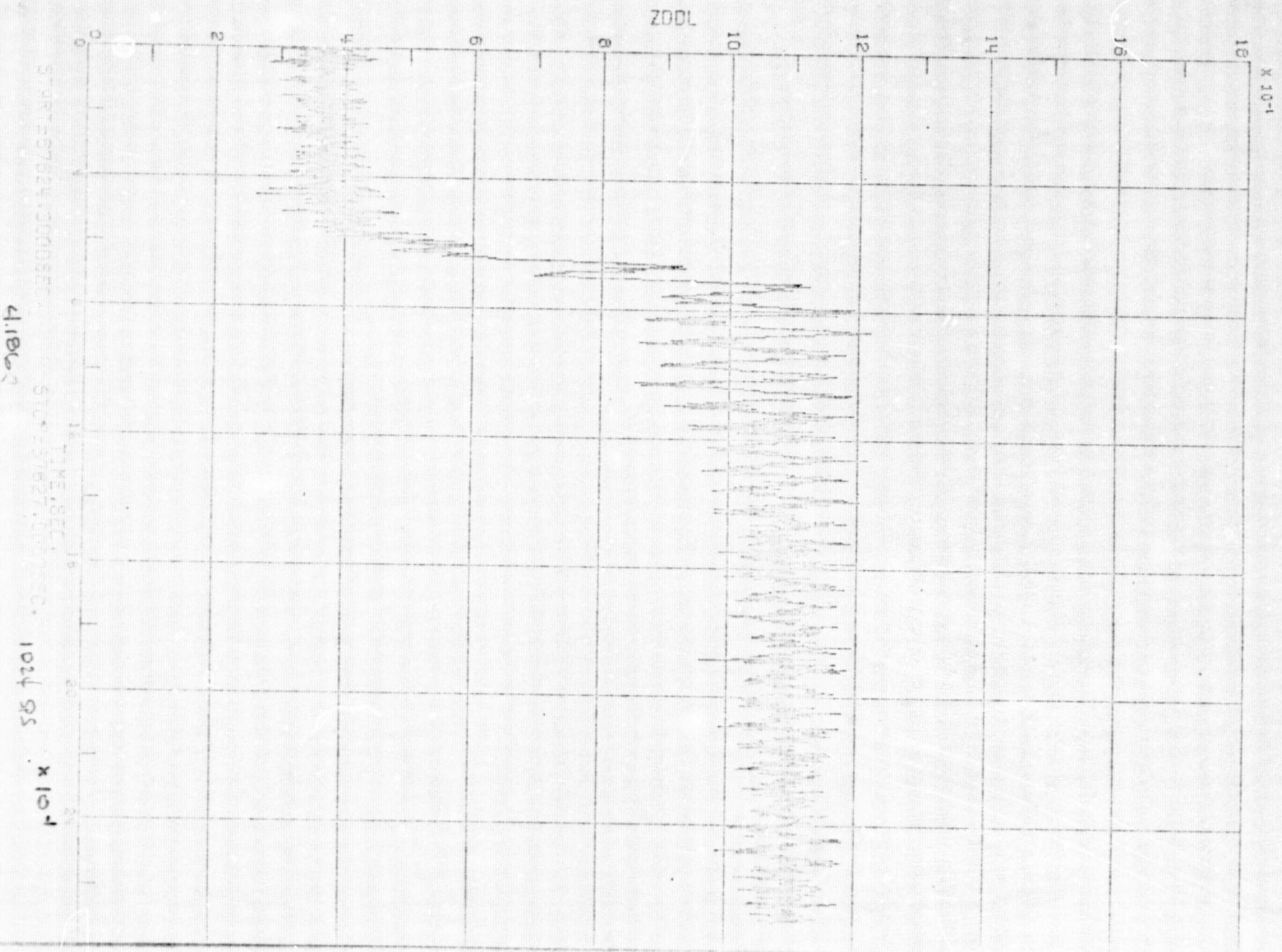
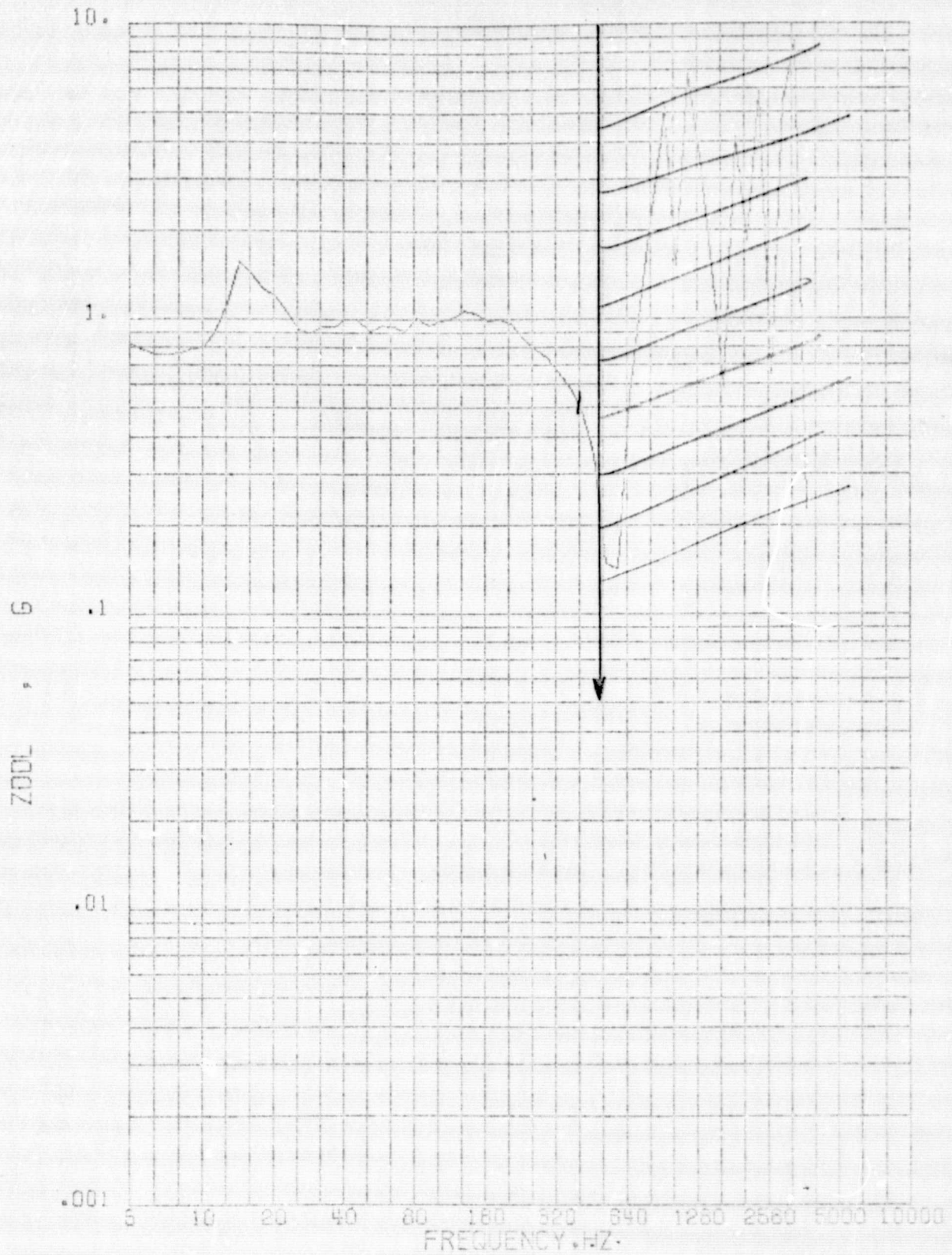


Figure 4.92a

SHOCK SPECTRUM



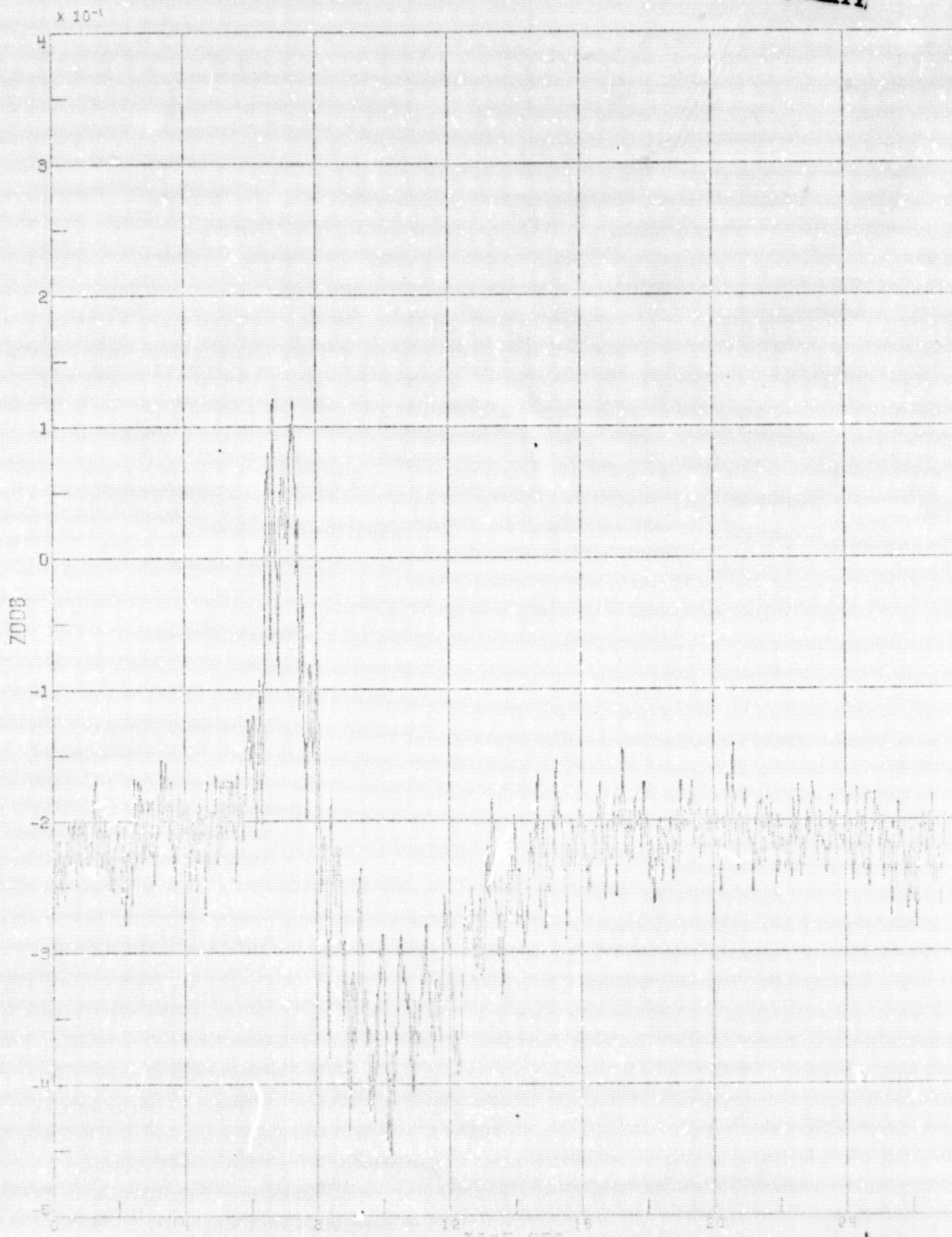
START=67624.8000SEC. STOP=67627.0000SEC. Q=10.

VIKING 8 ME 8 11681 1024 SPS 9/ ZDDL

4.926
4.187

Figure 4.92b

ORIGINAL PAGE IS
OF POOR QUALITY



START=57674.5000SEC.

STOP=57827.0000SEC.

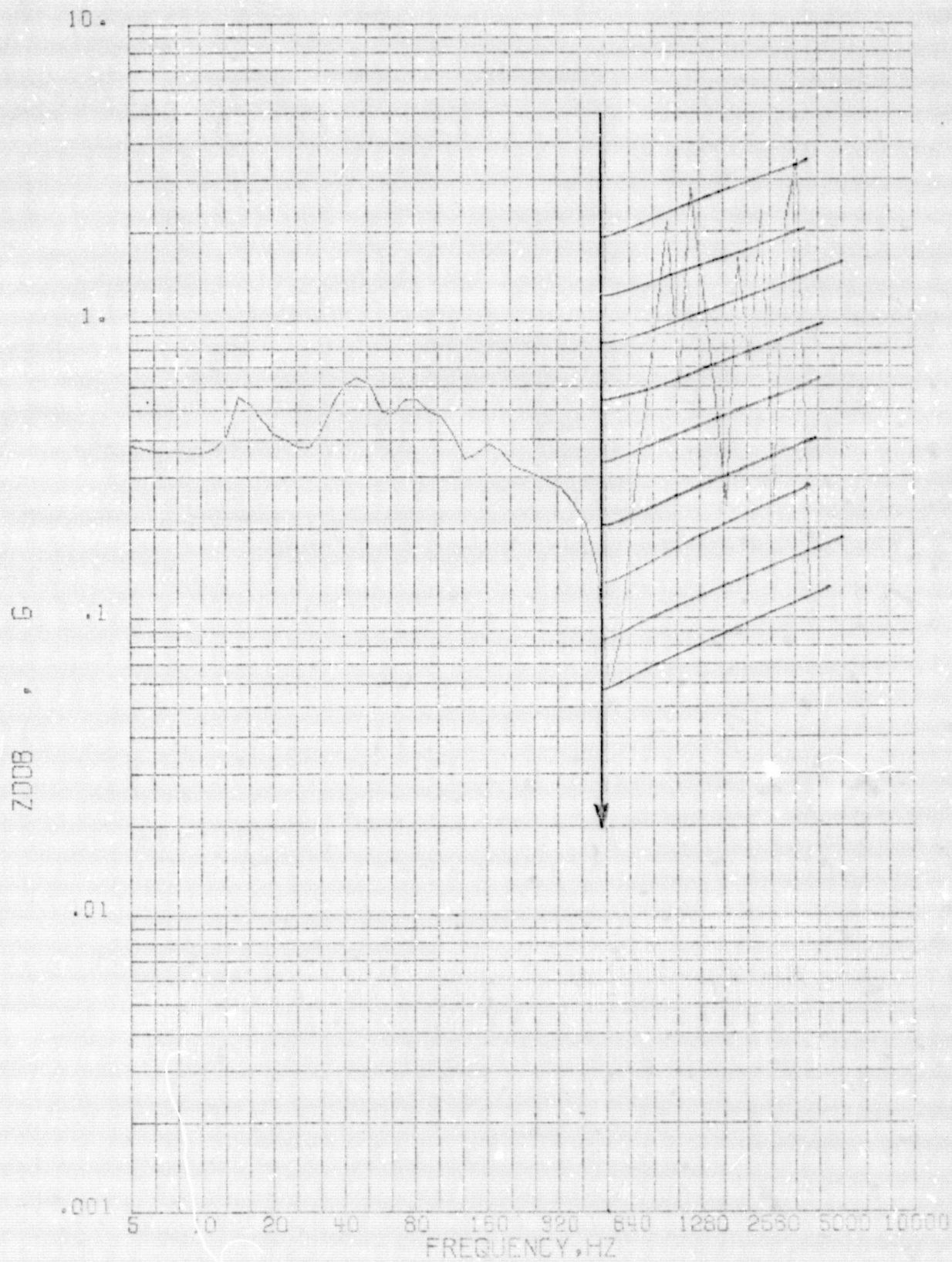
102 SPS

$\times 10^{-1}$

594.88

Figure 4.93a

SHOCK SPECTRUM



START=67624.9000SEC.

STOP=67627.0000SEC.

G=10.

VIKING 5

ME 8 110911

1024 SPS

9/

Z008

4934.189

Figure 4. 93b

X 10⁻¹

ORIGINAL PAGE IS
OF POOR QUALITY

CY1820

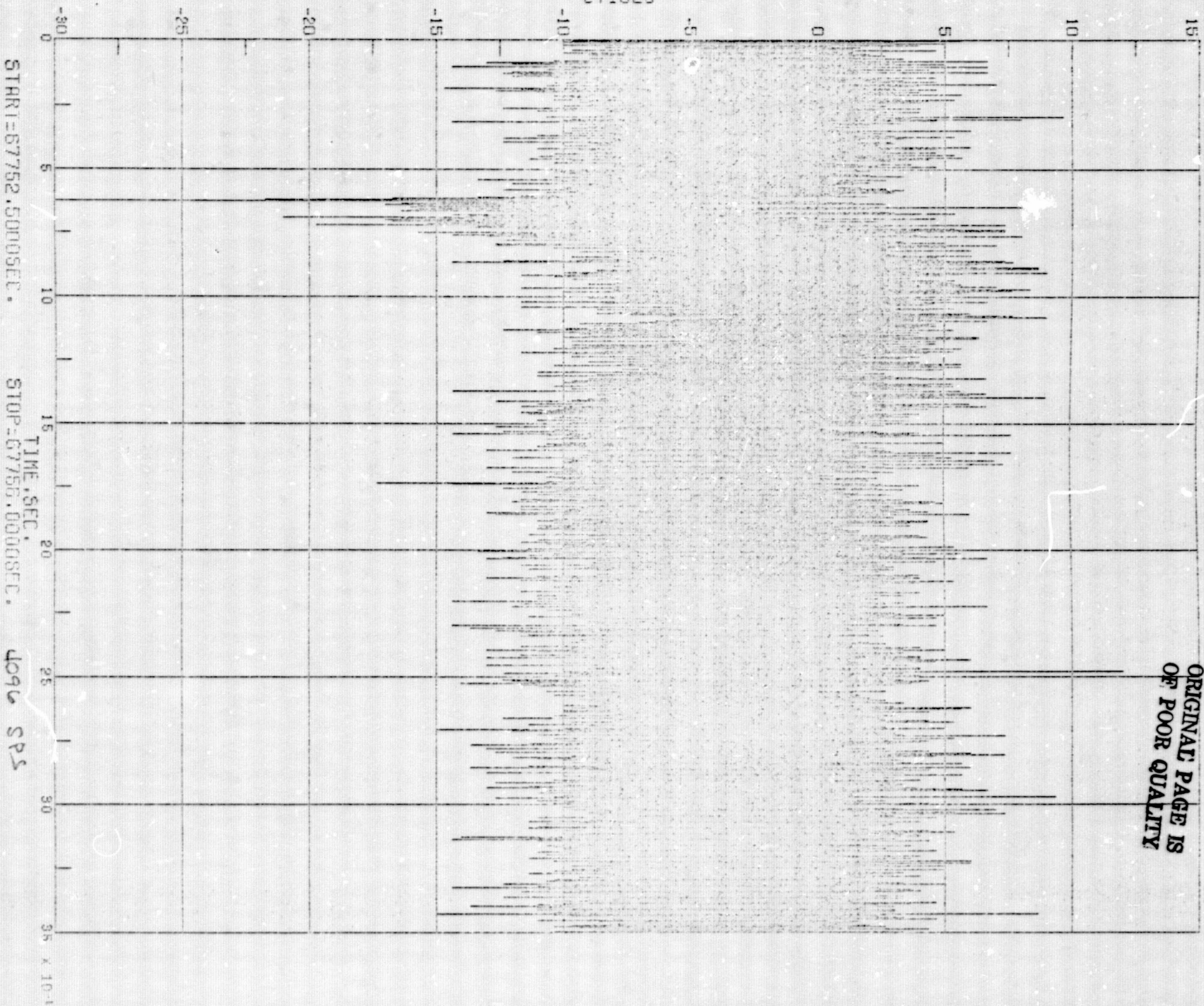
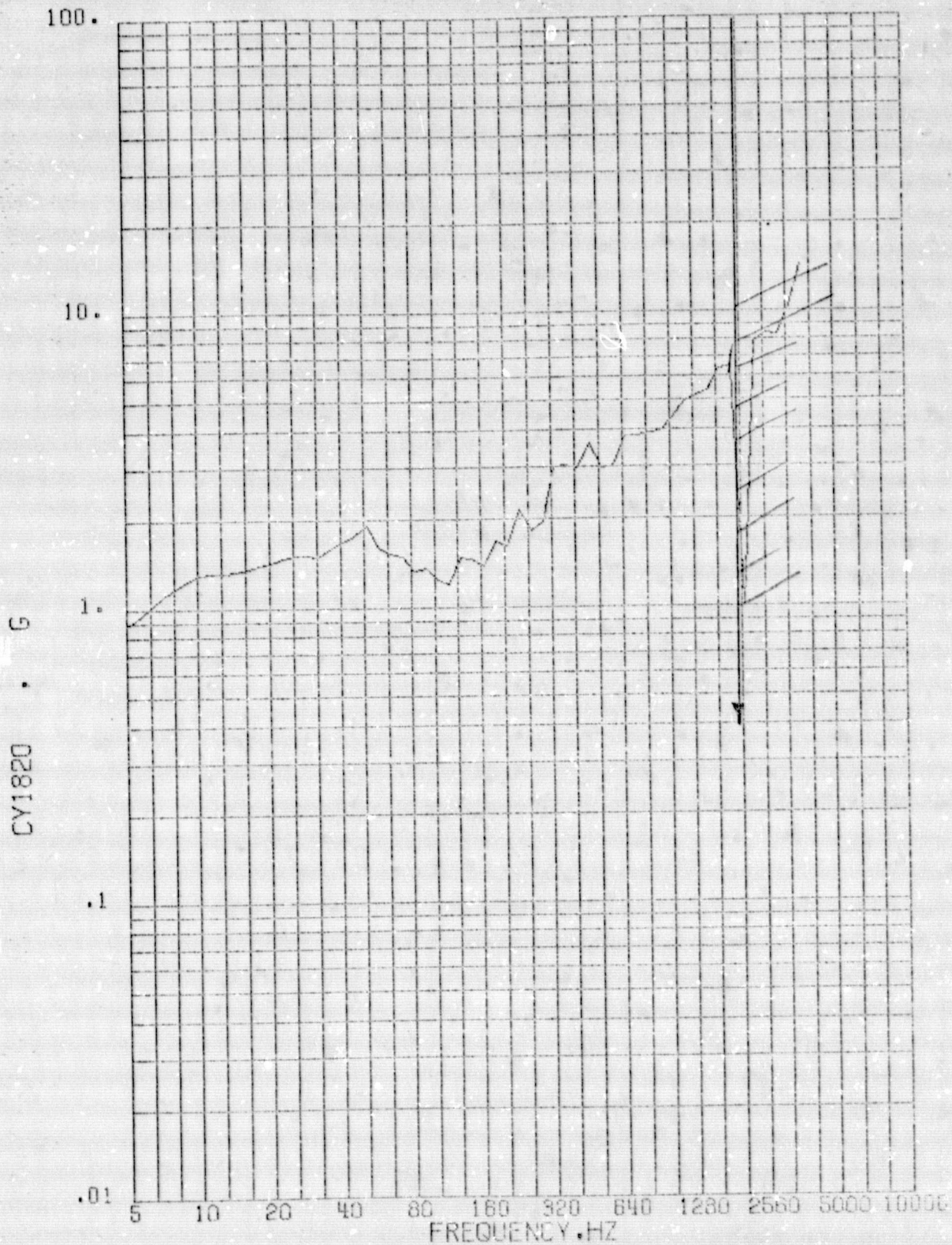


Figure 4.91a

SHOCK SPECTRUM



START=67753.6500SEC.

STOP=67756.0000SEC.

0=10.

VIKING B

ME CO 1 (ANT) 4096 SRS

9/ CY1820

4.98
4.191

Figure 4. 94b

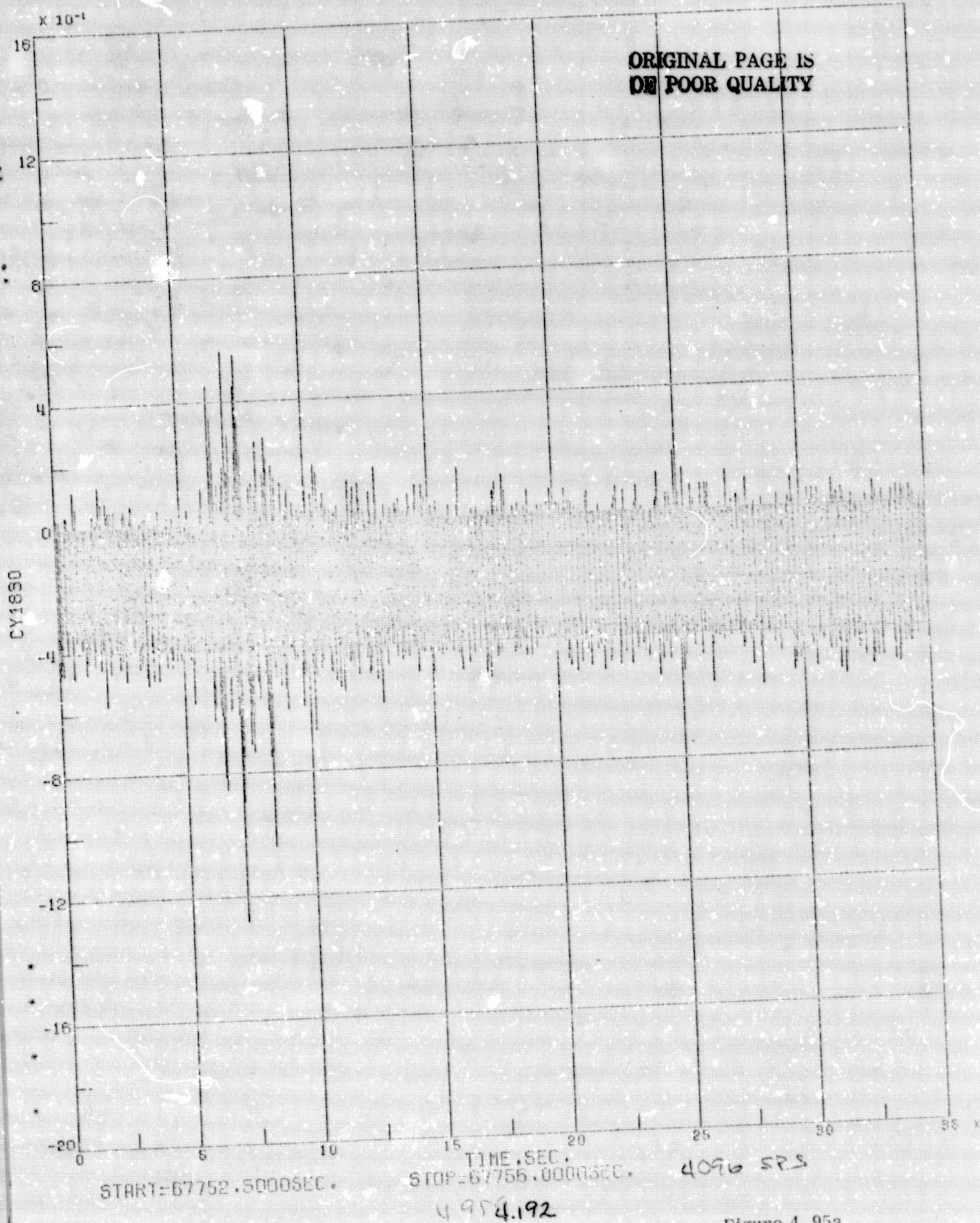
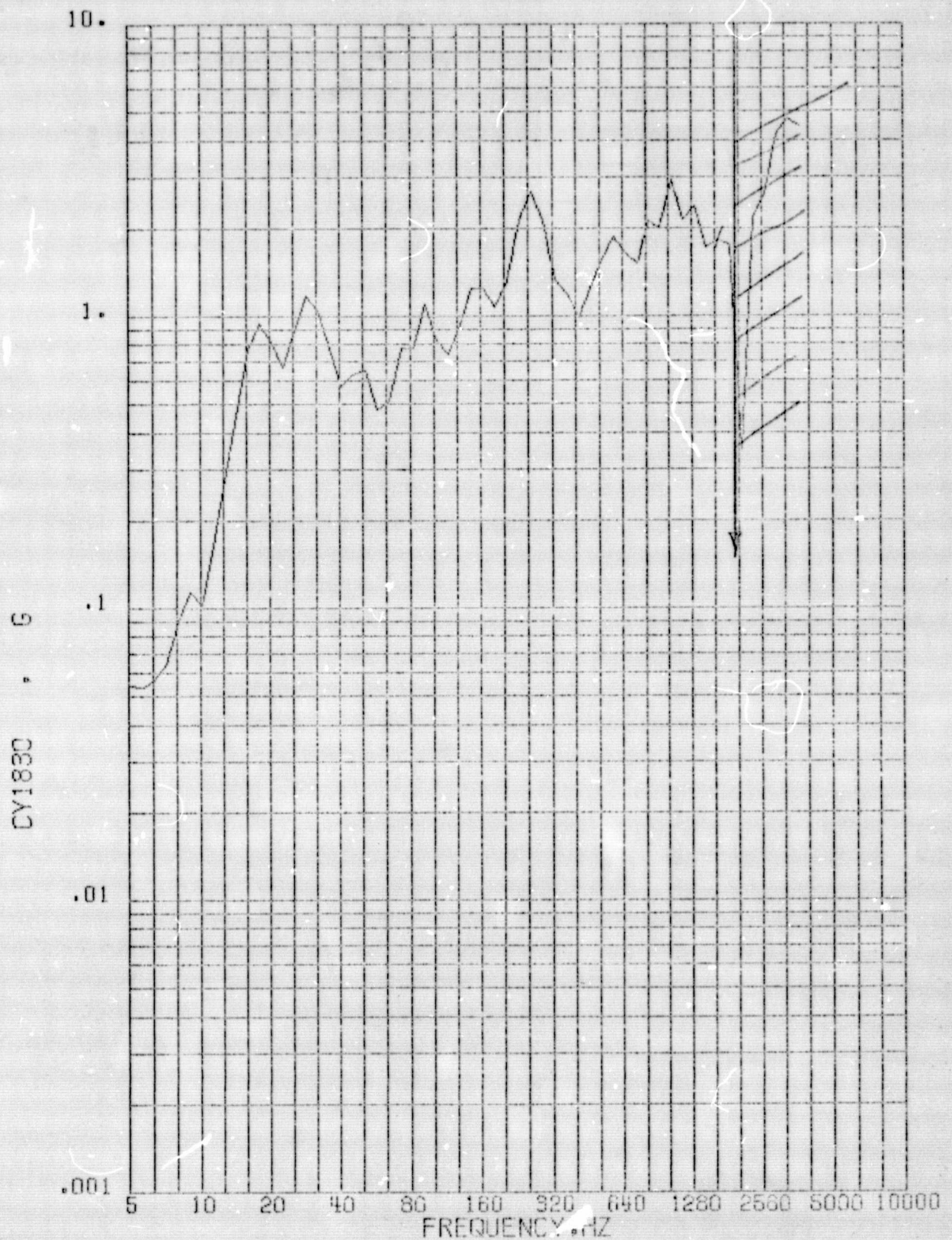


Figure 4. 95a

SHOCK SPECTRUM

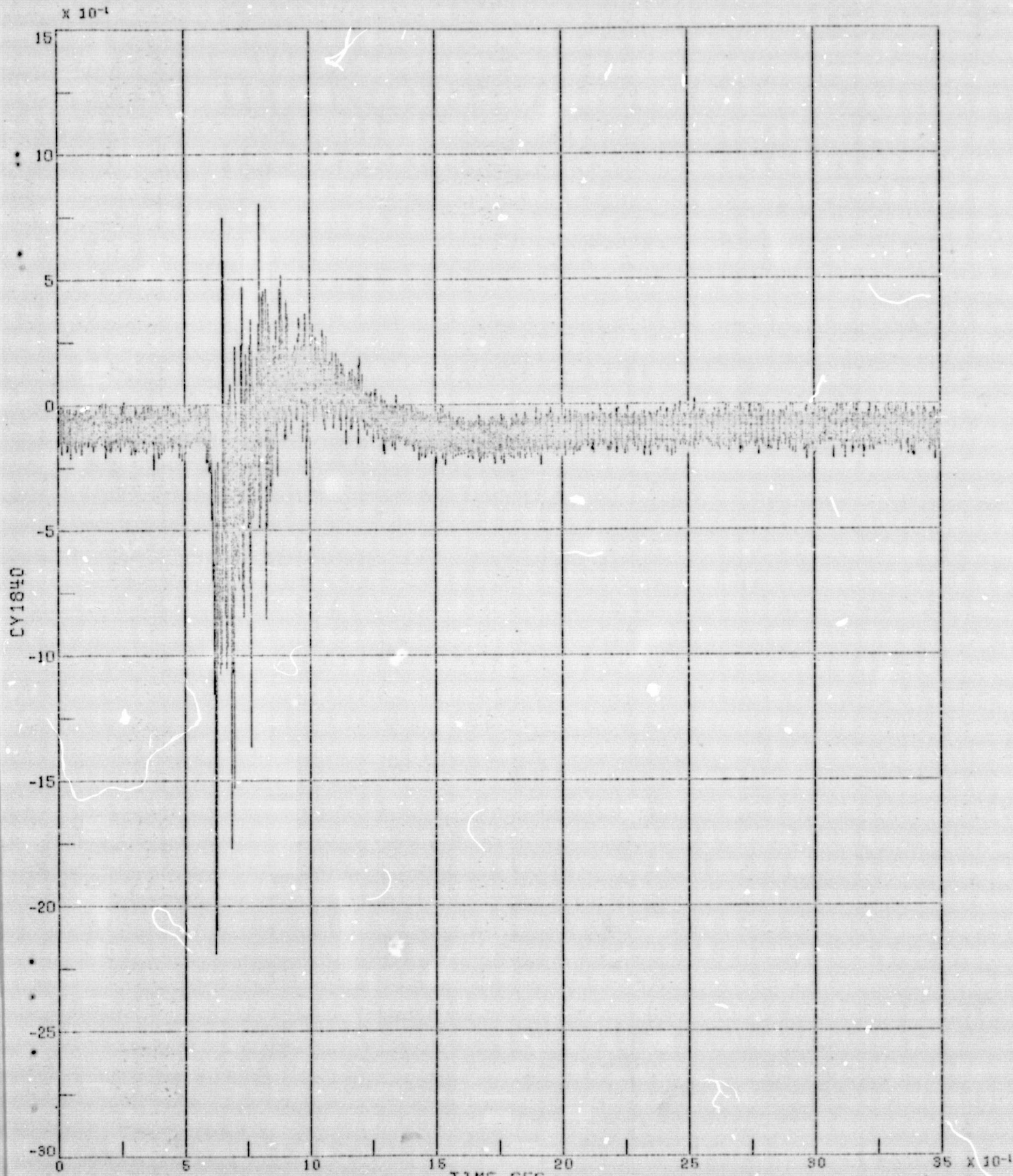


START=67753.0500SEC. STOP=67756.0000SEC. Q=10.
 VIKING B ME CD 1(ANT) 4096 SPS 9/ CY1830

4.95h
 4.193

Figure 4. 95b

0-3



START=67752.5000SEC.

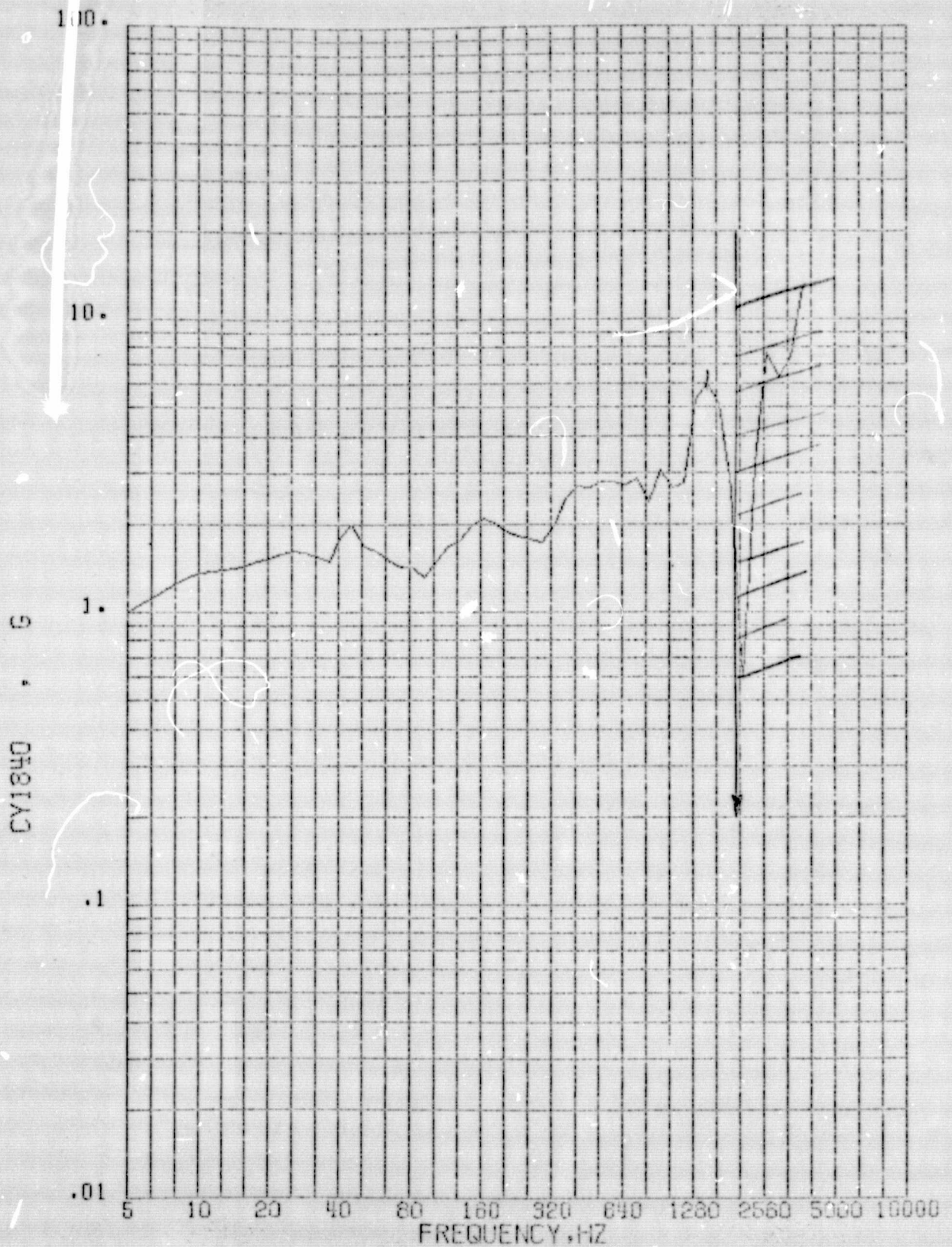
STOP=67756.0000SEC.

4096 SPS

4964.194

Figure 4. 96a

SHOCK SPECTRUM



START=67753.0500SEC.

STOP=67756.0000SEC.

Q=10.

VIKING E

ME CO 1 (ANT)

4096 SPS

9/ CY1840

4,966
4.195

Figure 4. 96b

ORIGINAL PAGE IS
OF POOR QUALITY

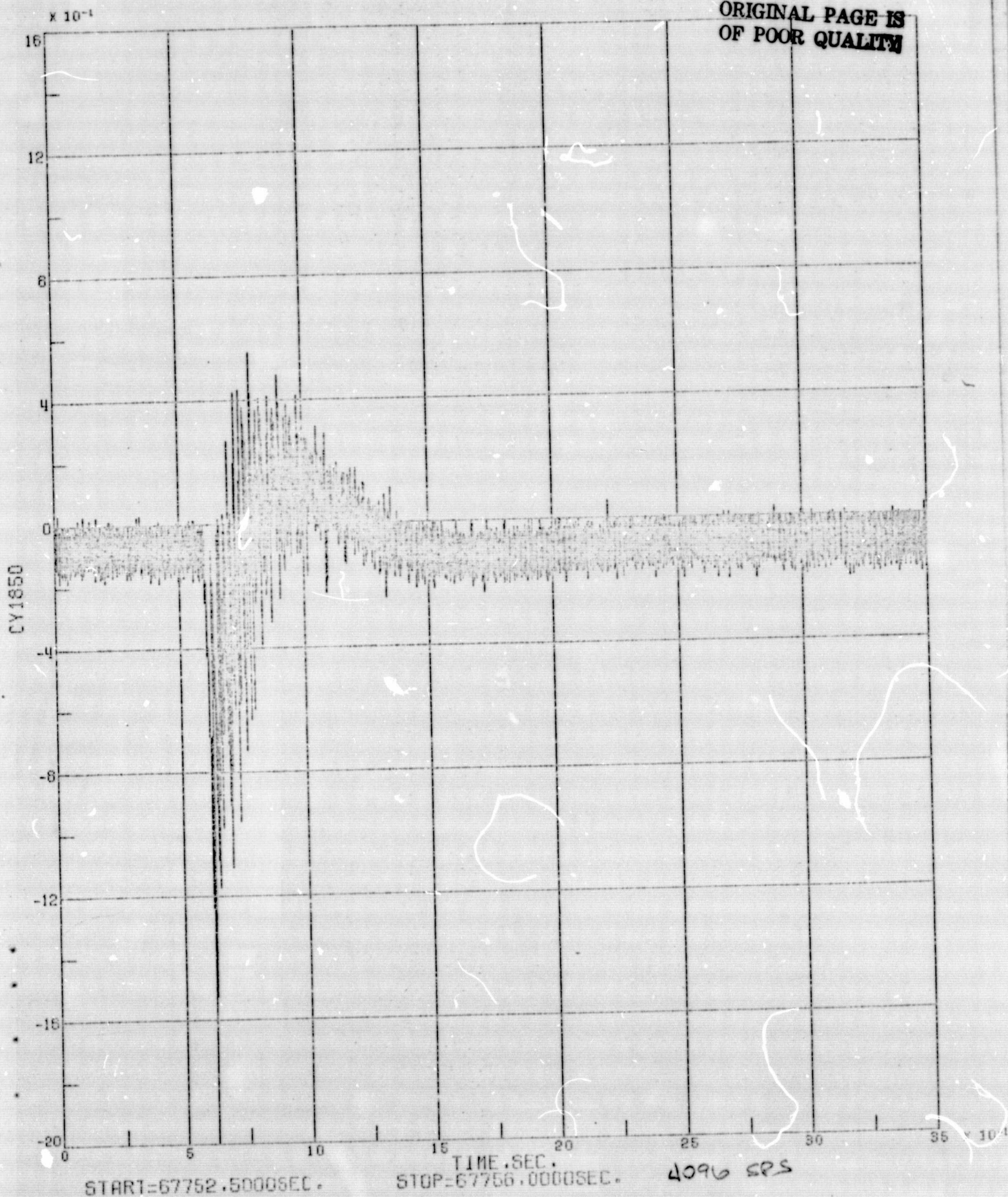
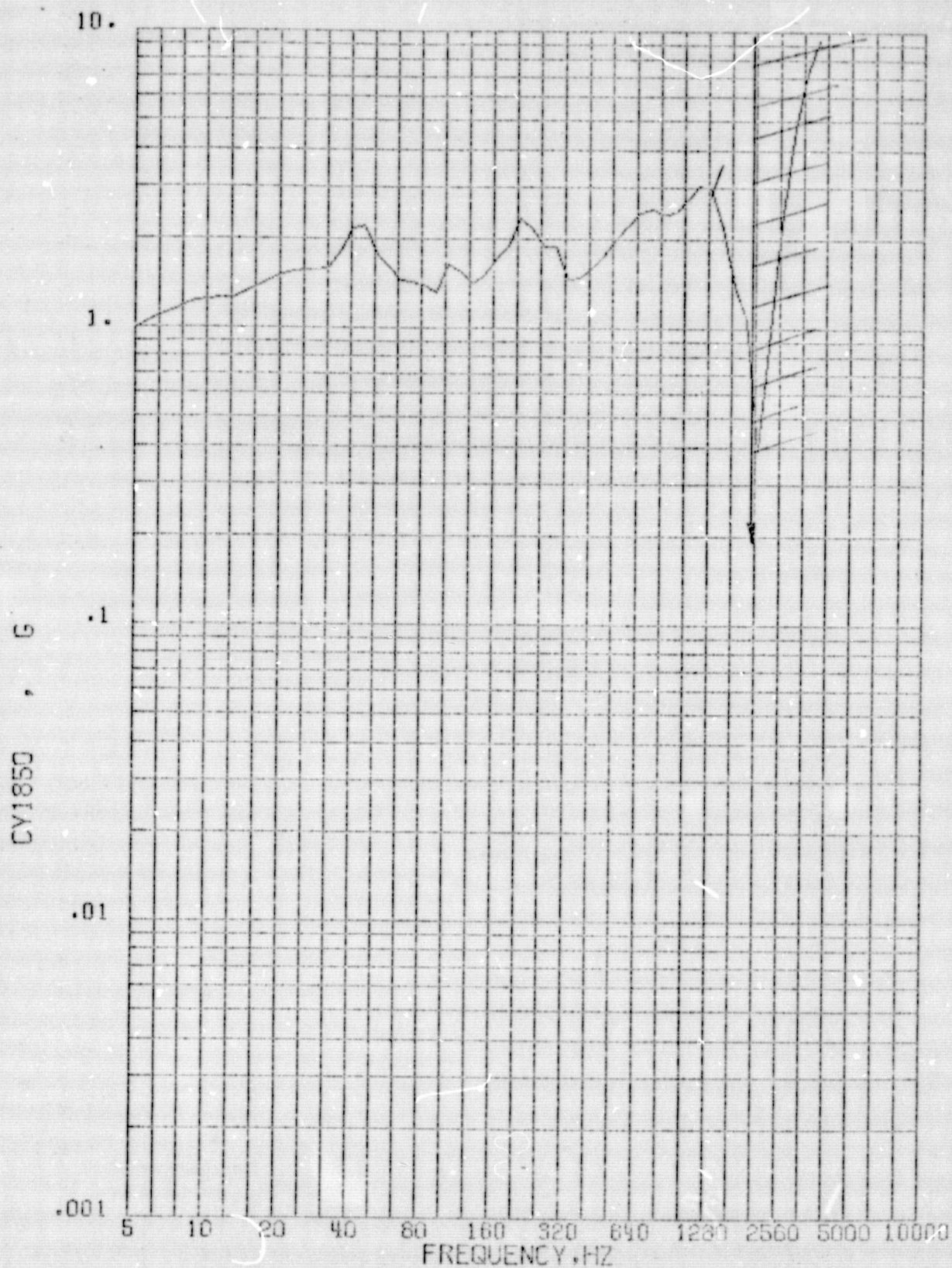


Figure 4.97a

SHOCK SPECTRUM



START=67753.0500SEC.

STOP=67756.0000SEC.

Q=10.

VIKING B

ME CO 1 (ANT)

4096 SRS

9/ CY1850

4976 4.197

Figure 4. 97b

ORIGINAL PAGE IS
OF POOR QUALITY

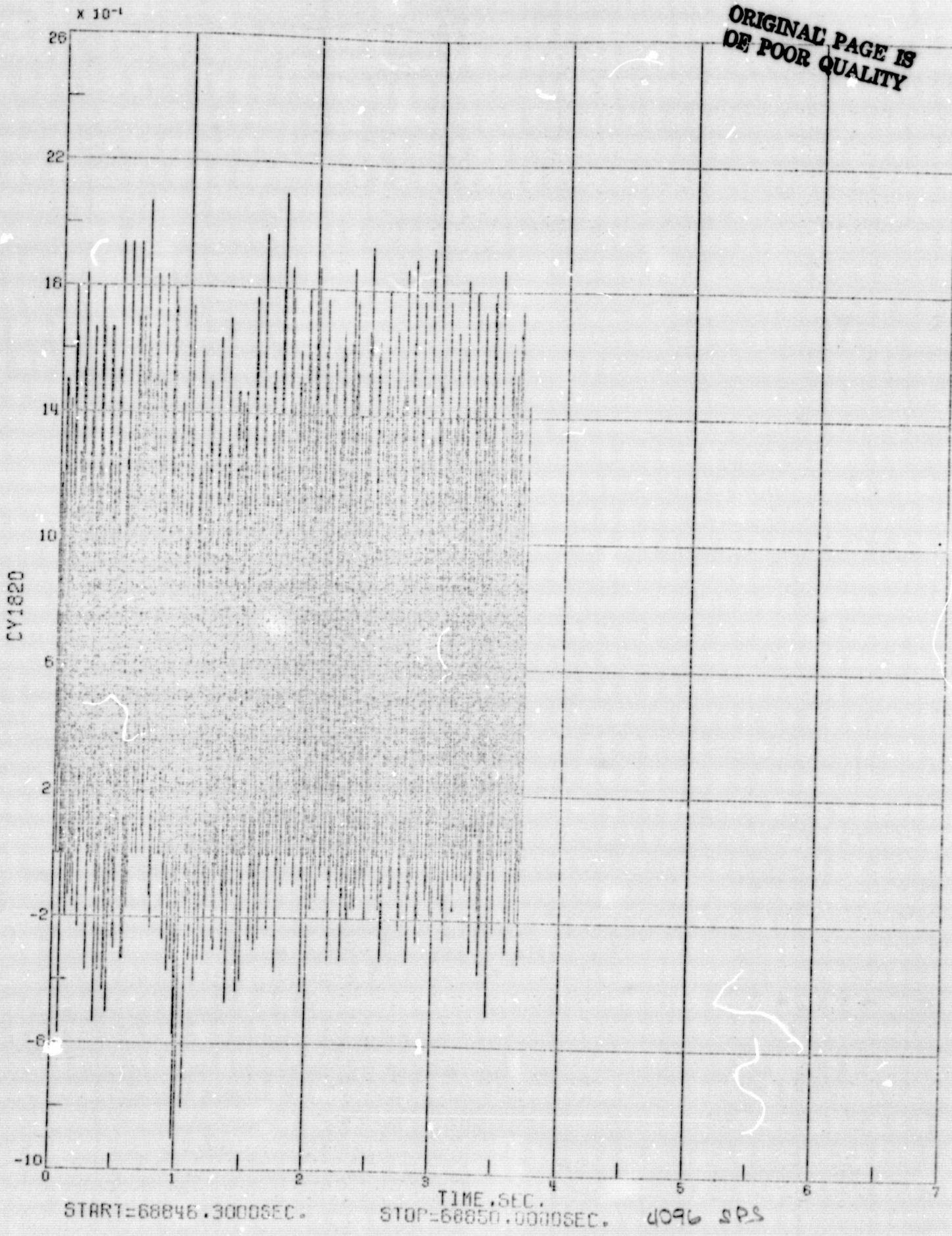
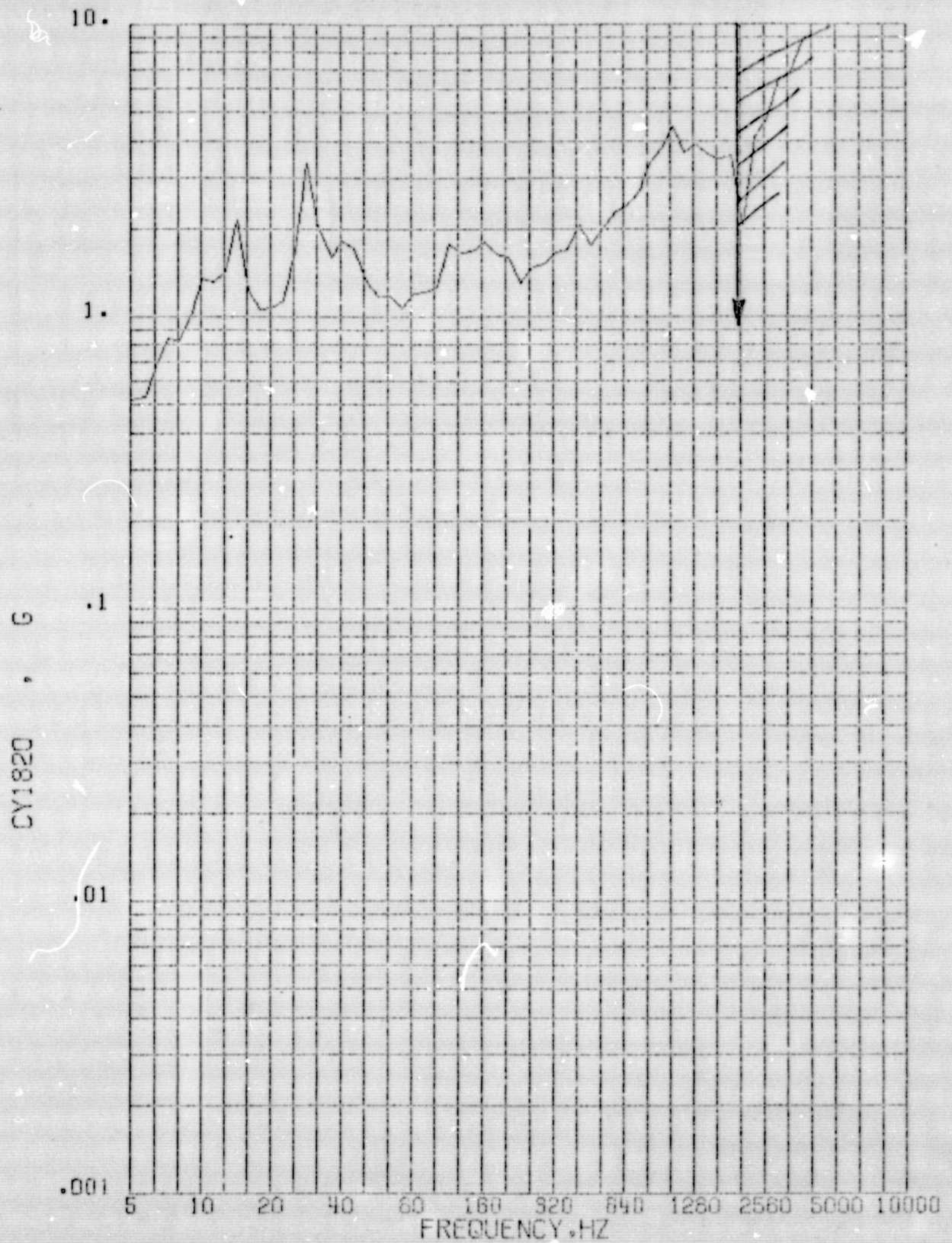


Figure 4.98a

SHOCK SPECTRUM



START=68846.8000SEC.

STOP=68850.0000SEC.

G=10.

VIKING 8

ME S 2 (ARIA-1)

4096 SPS

9/ CY1820

4.99b
4.199

Figure 4. 98b

ORIGINAL PAGE IS
OF POOR QUALITY

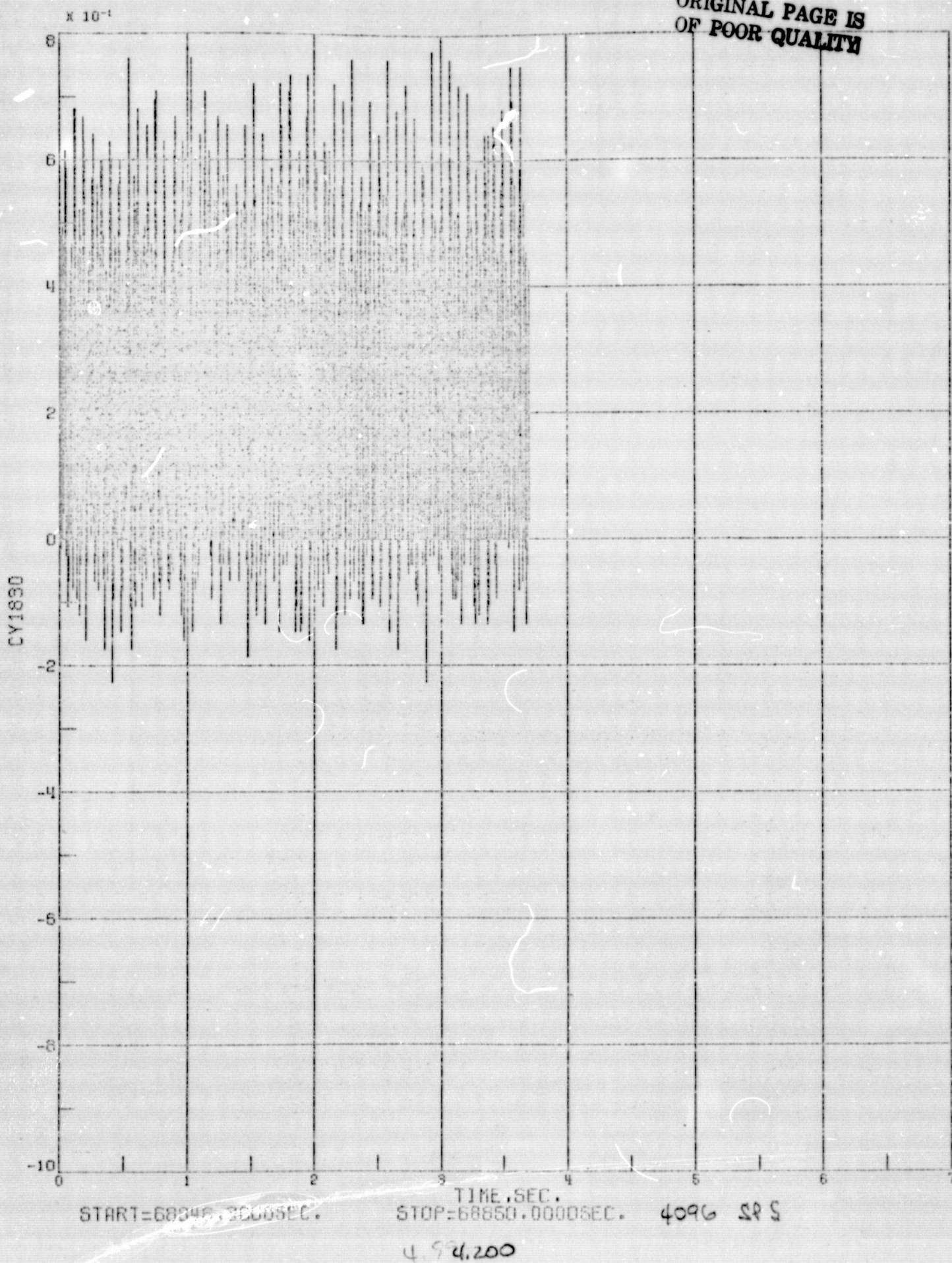
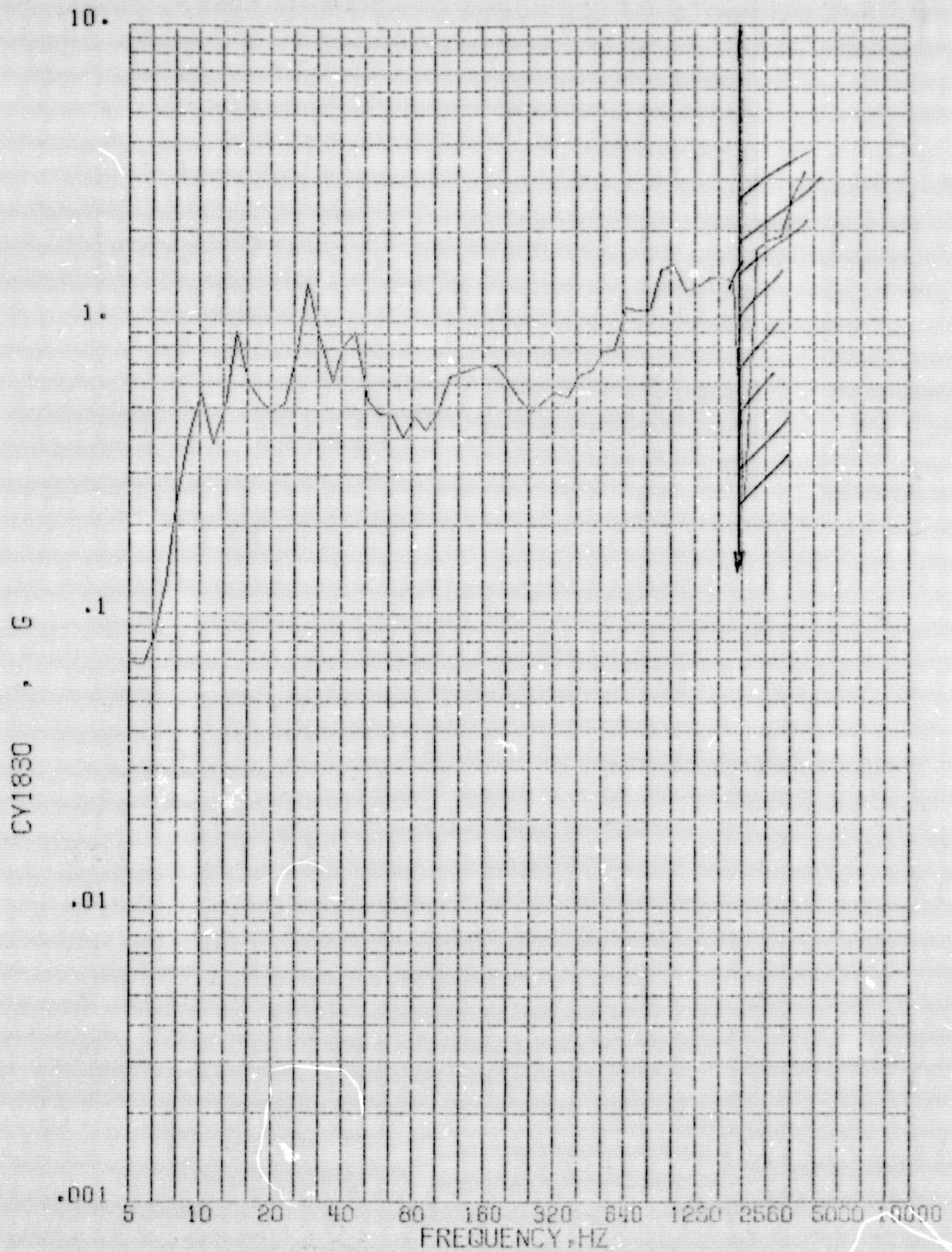


Figure 4.99a

SHOCK SPECTRUM



START=68846.8000SEC.

STOP=68850.0000SEC.

Q=10.

VIKING B

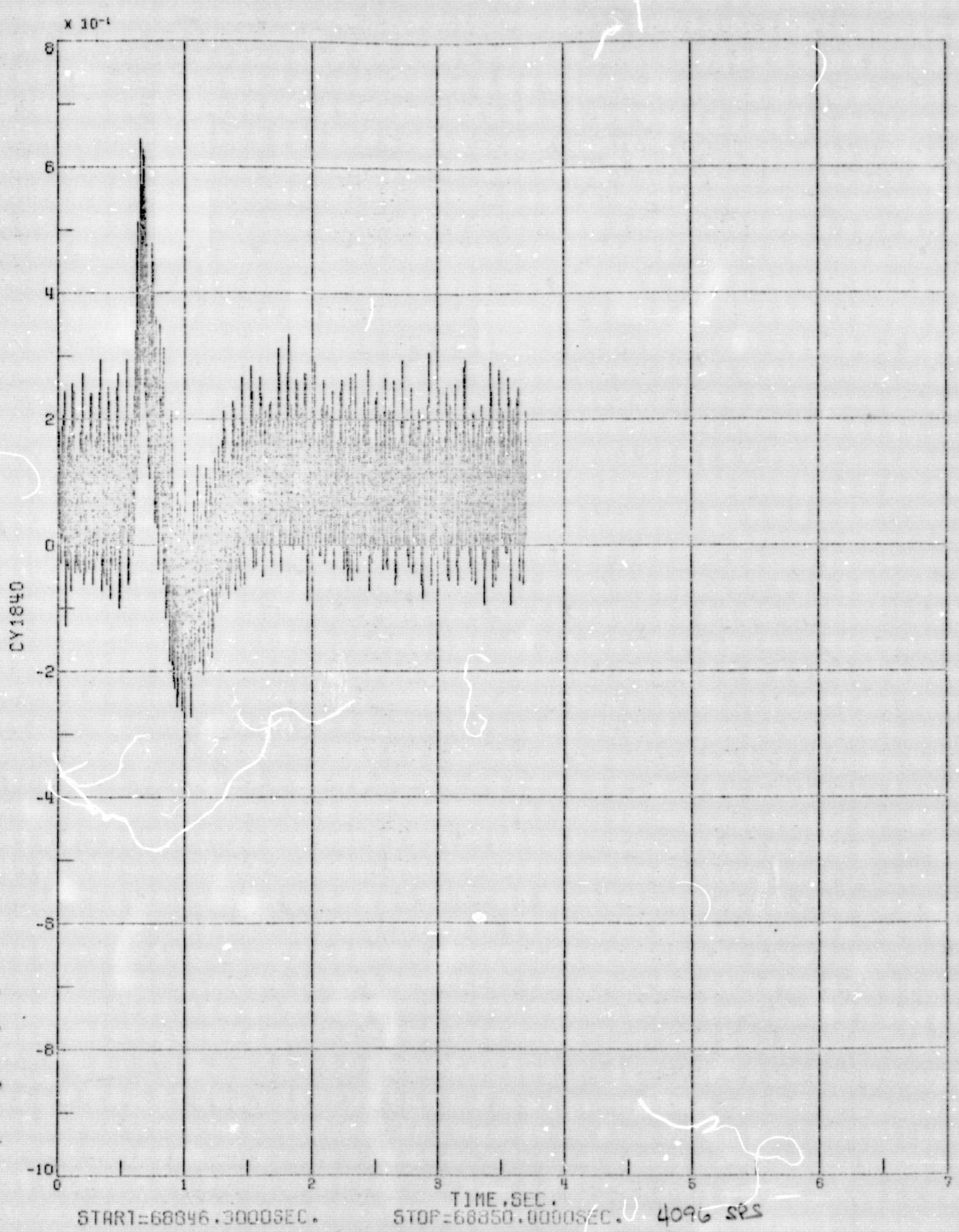
ME S 2 (ARIA-1)

4096 SPs

9/ CY1830

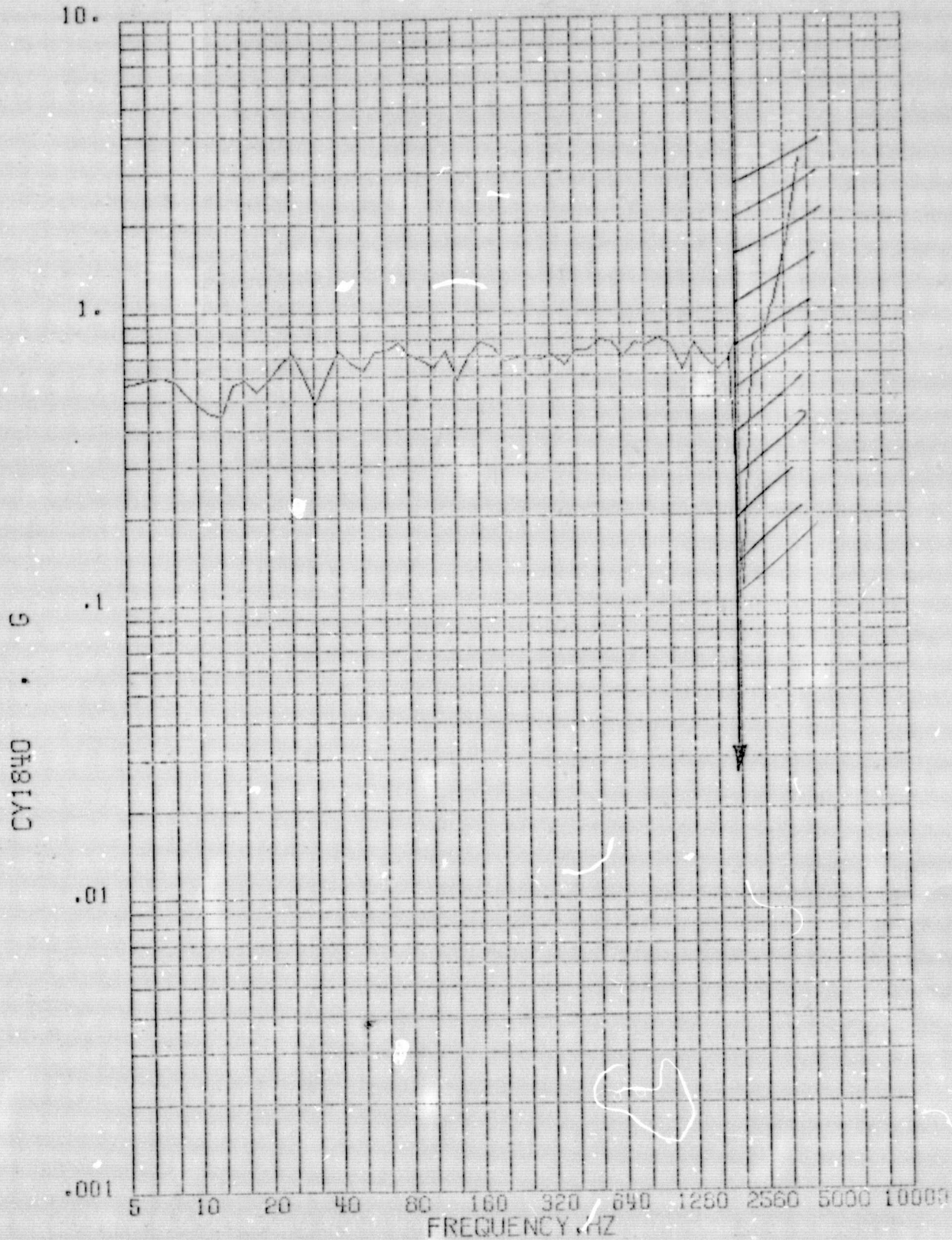
4.20/995

Figure 4.99b



4.202

Figure 4.100a



START=68846.8000SEC. STOP=68850.0000SEC. Q=10.

VIKING B ME S 2 (ARIA-1) 4096 SPS 9/ CY1840

4.100b
4.203

Figure 4.100b

ORIGINAL PAGE IS
OF POOR QUALITY

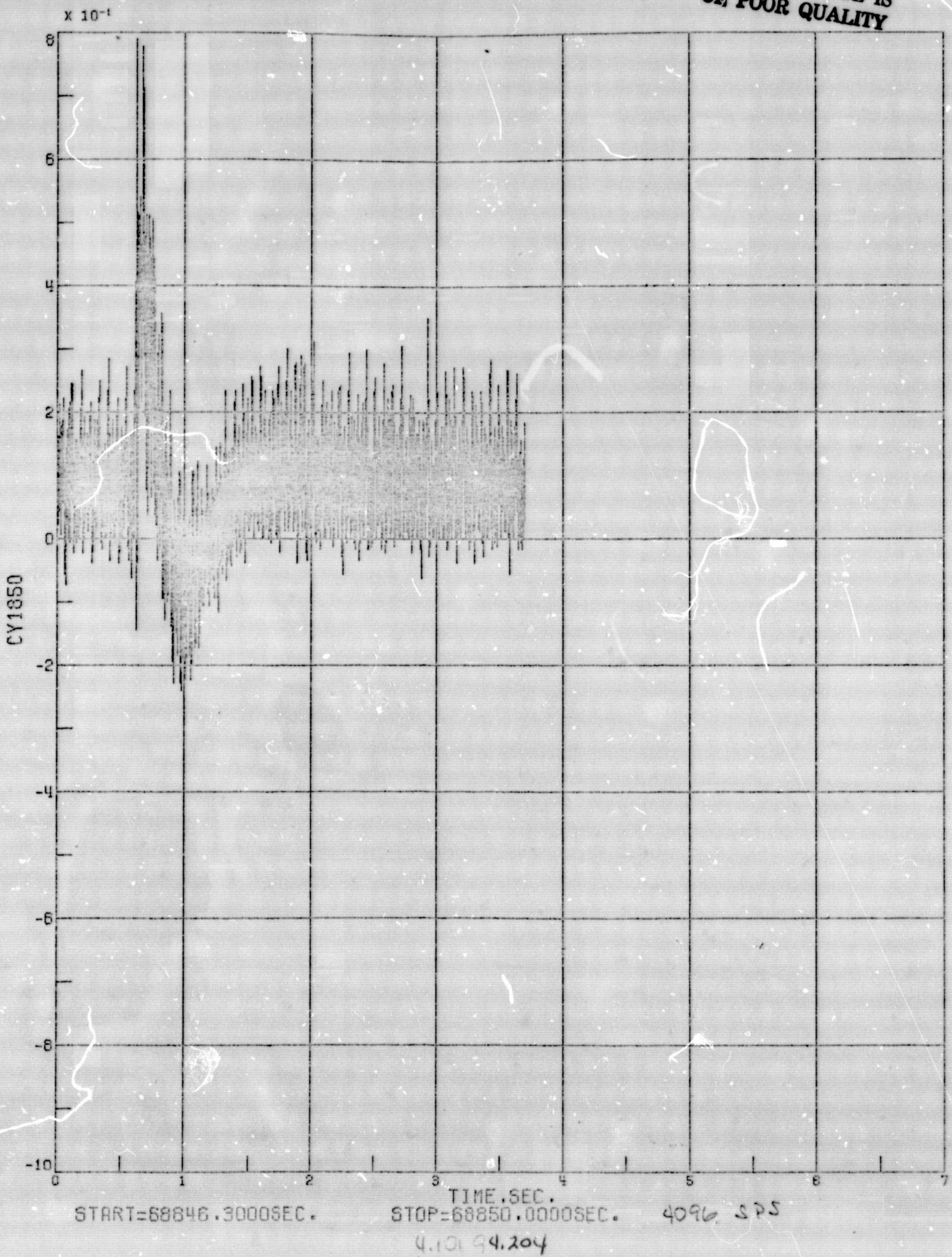
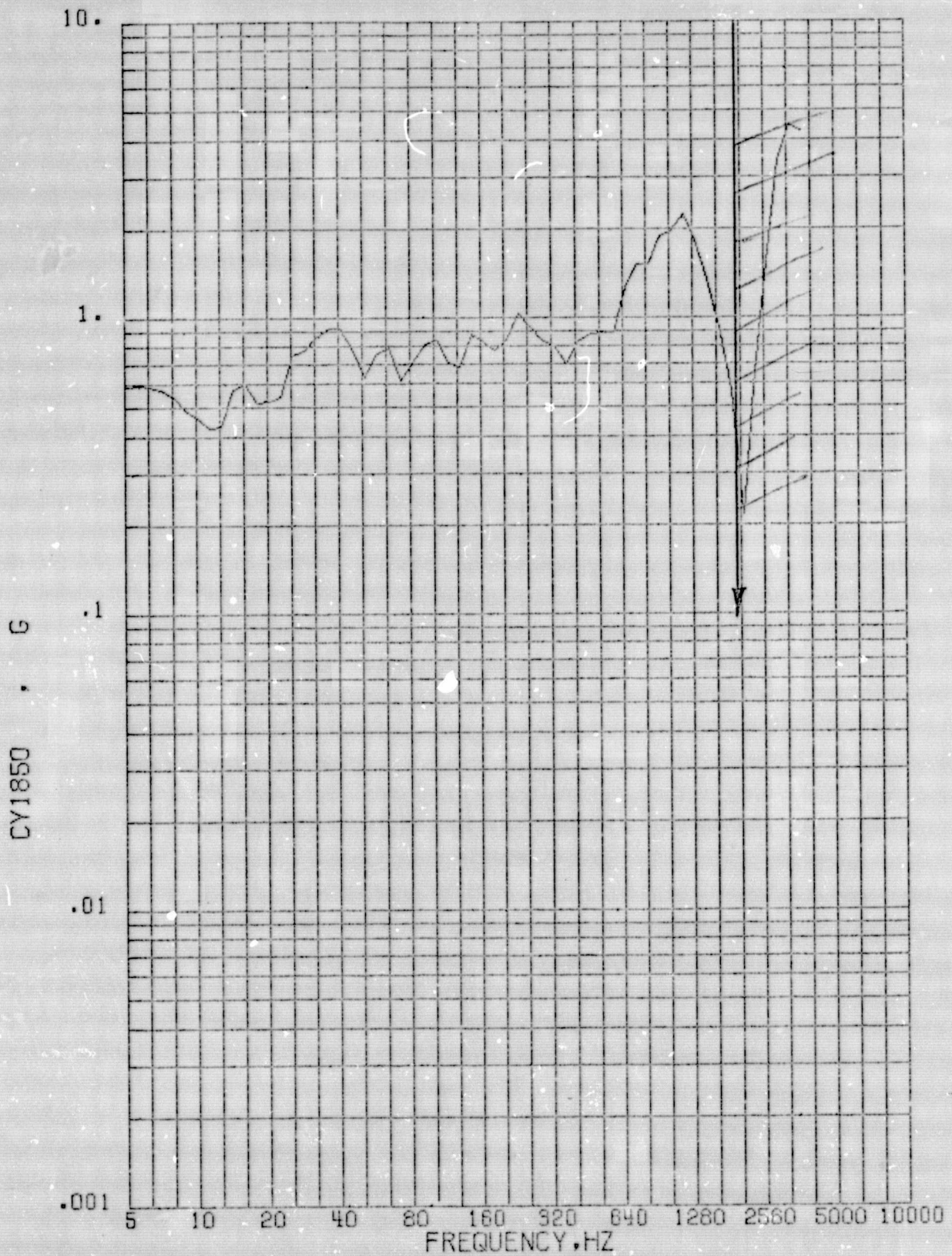


Figure 4.101a

SHOCK SPECTRUM



START=68846.8000SEC. STOP=68850.0000SEC. Q=10.

VIKING B ME S 2 (ARIA-1) 4096 SPS 9/ CY1850

4.1016 4.205

Figure 4.101b

ORIGINAL PAGE IS
OF POOR QUALITY

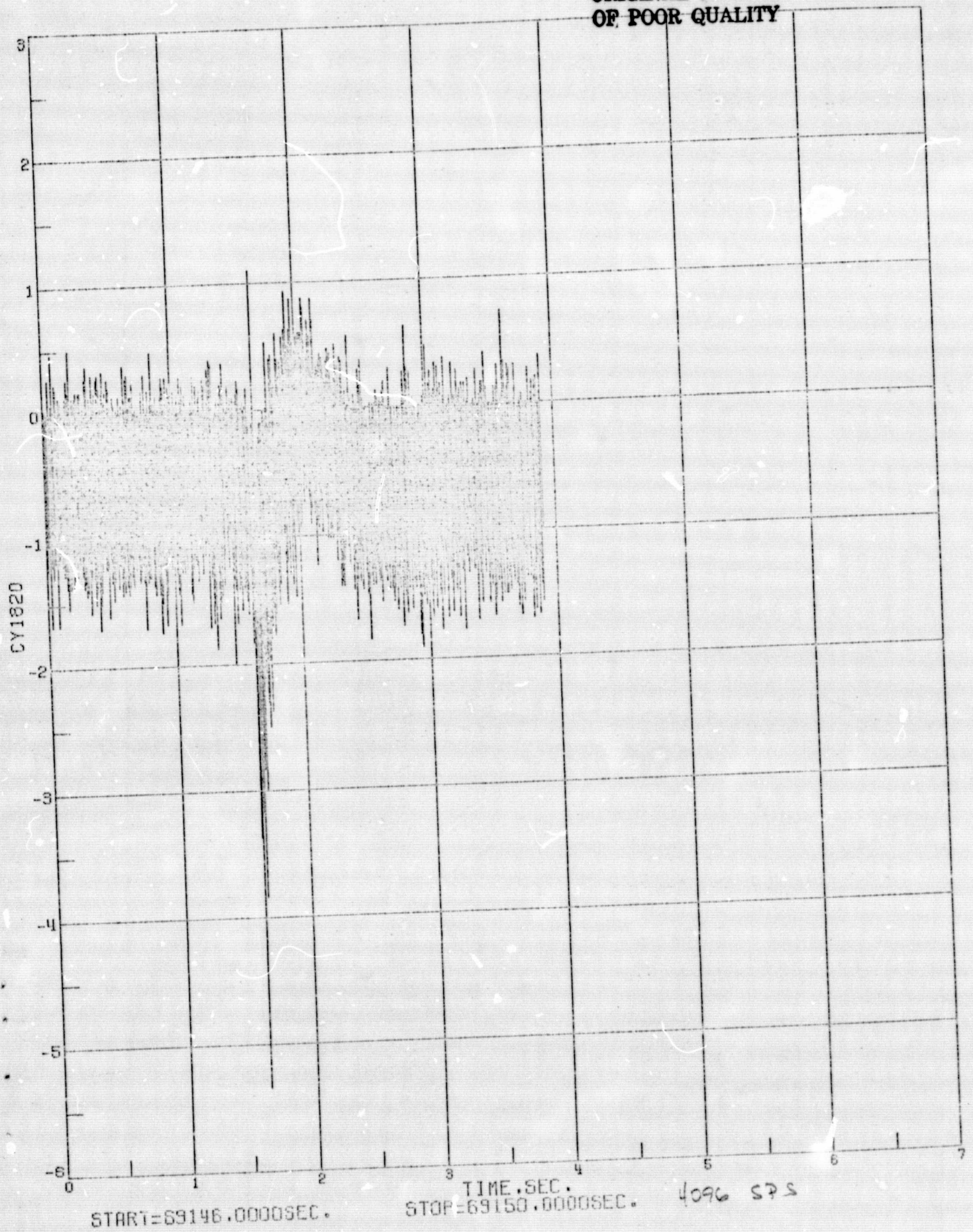
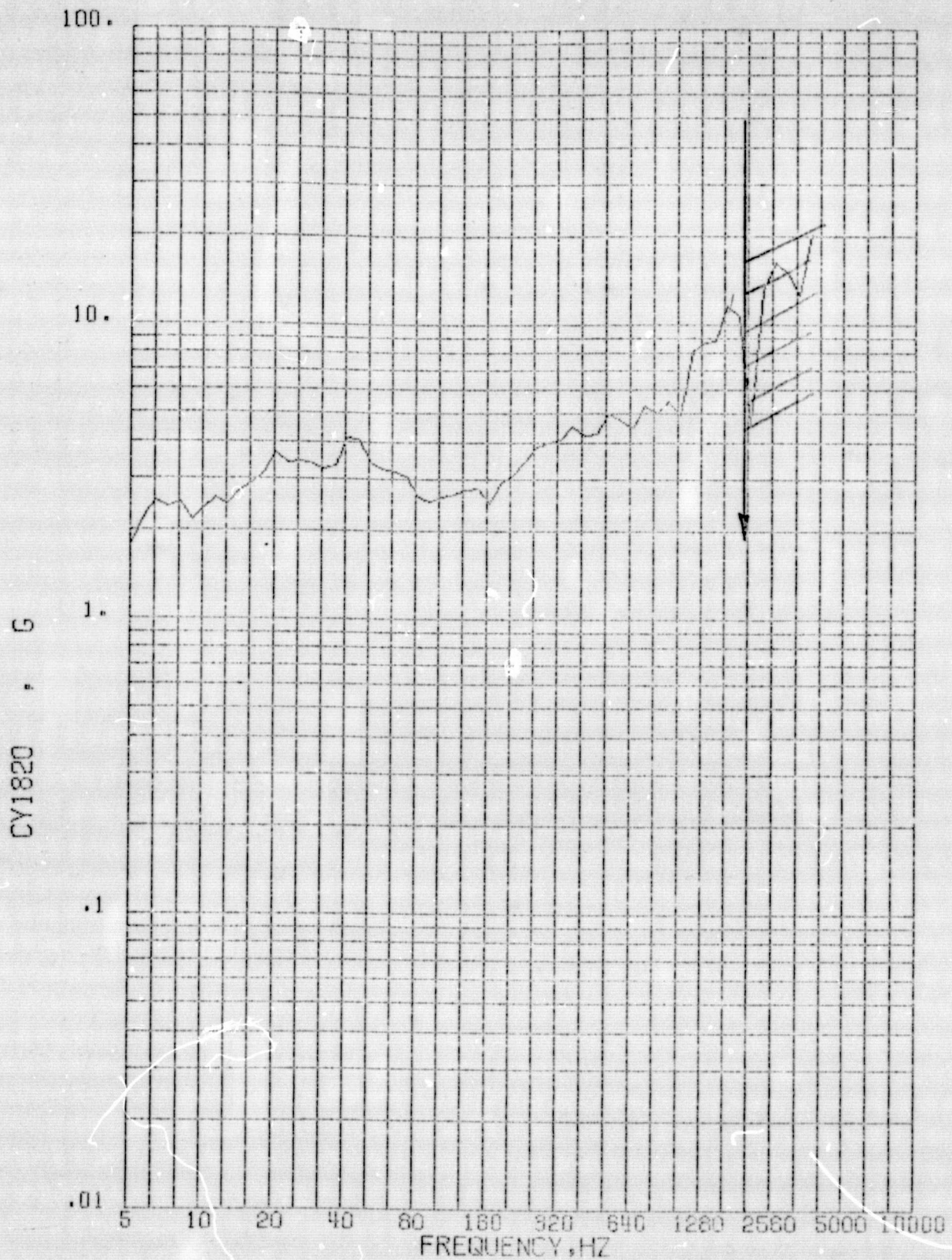


Figure 4.102a

SHOCK SPECTRUM



START=63146.5000SEC.

STOP=63150.0000SEC.

Q=10.

VIKING B

NE CO 2(BUR)

4096 SPS

9/ CY1820

4.102 4.207

Figure 4.102b

ORIGINAL PAGE IS
OF POOR QUALITY

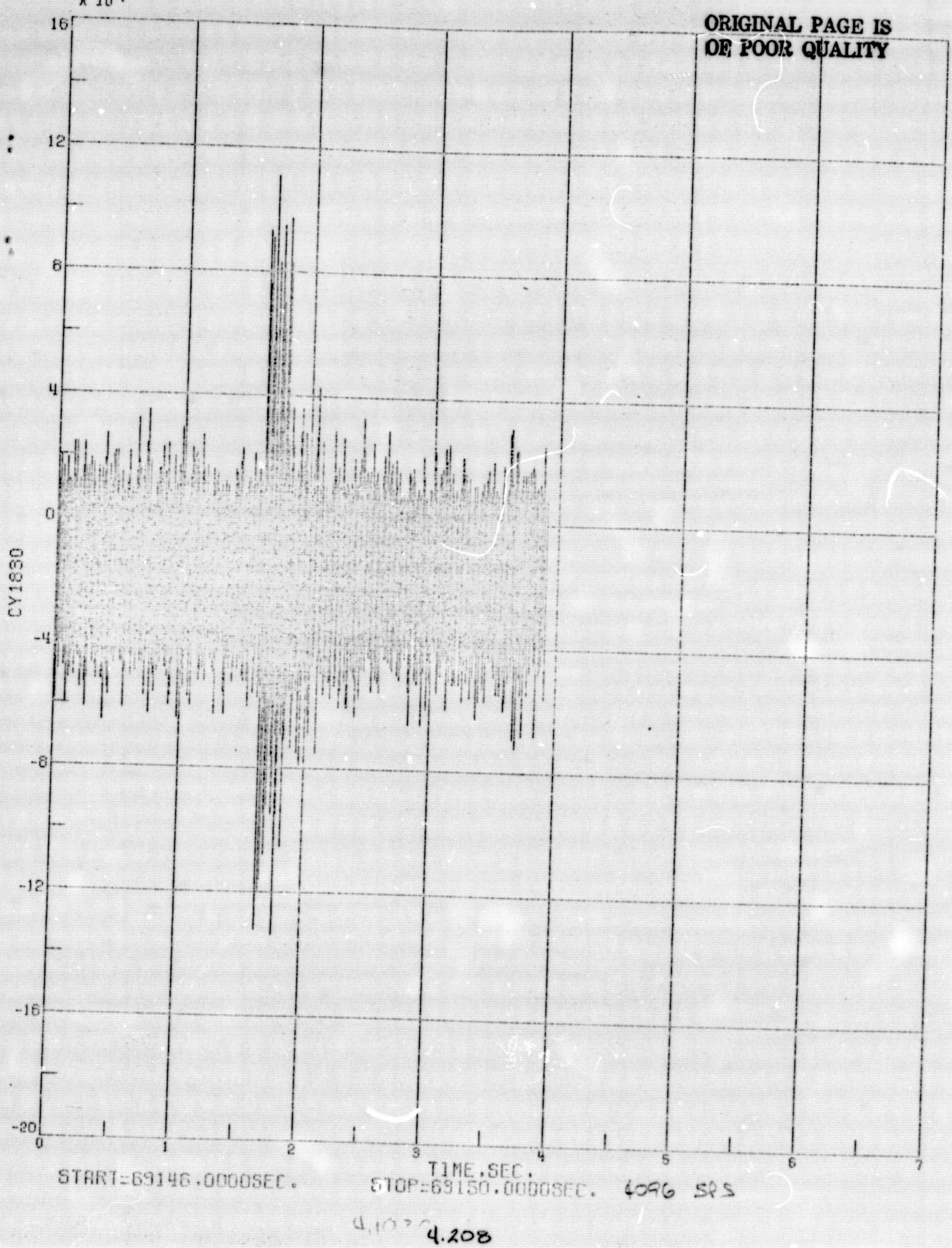
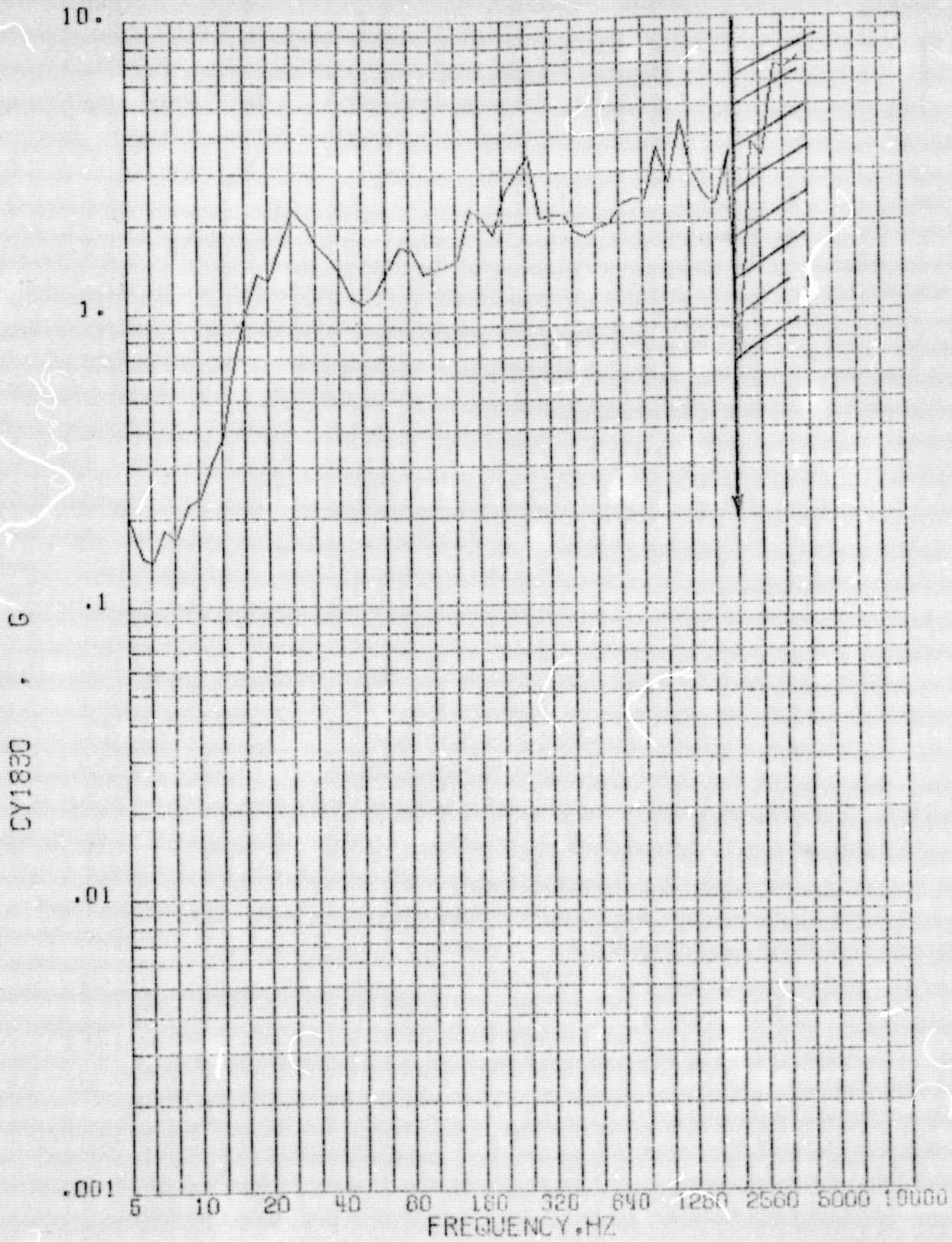


Figure 4.103a

SHOCK SPECTRUM



START=69146.5000SEC.

STOP=69150.0000SEC.

Q=10.

VIKING B

ME CD 2(BUR) 4096 SPS

9/ CY1830

4.103b

4.209

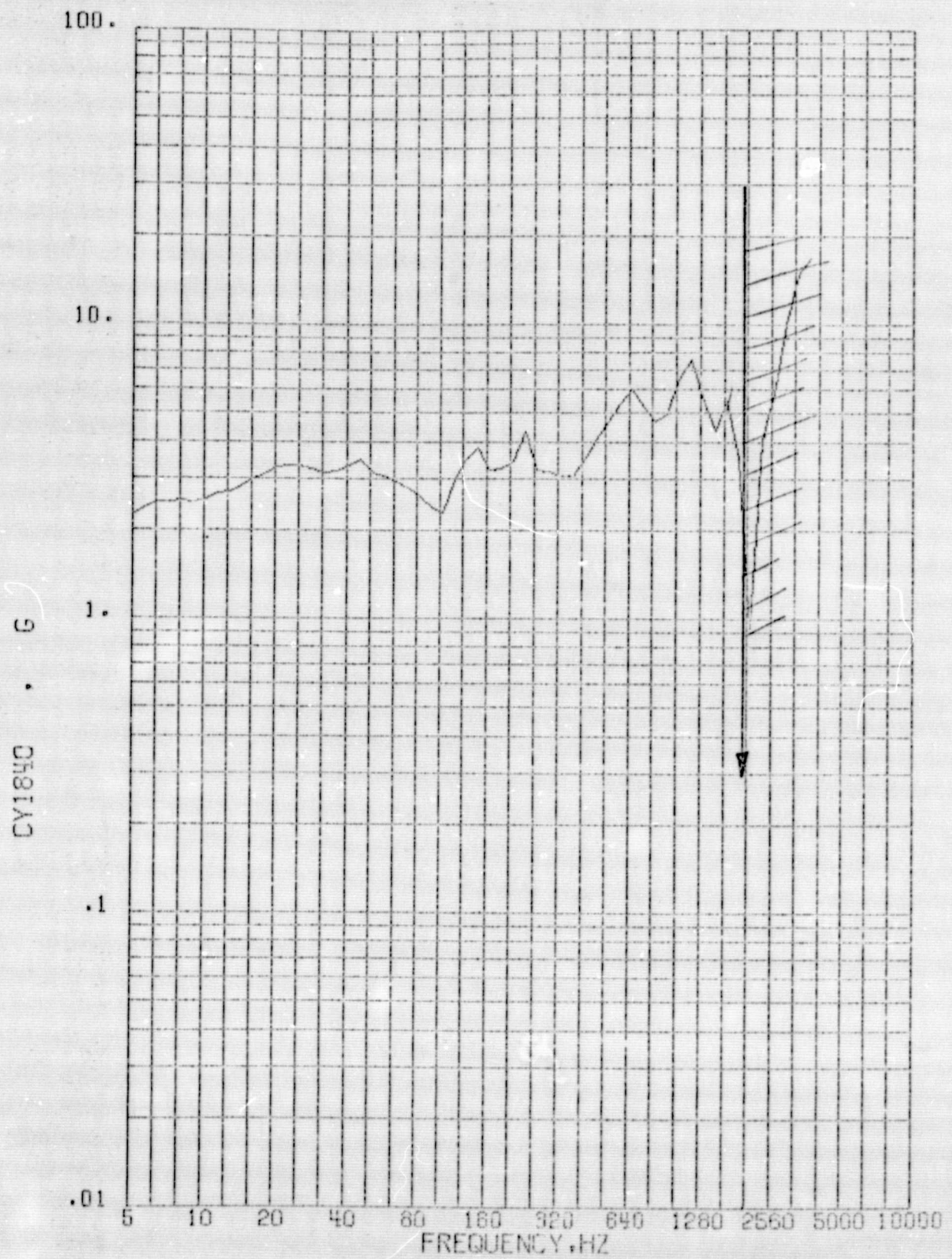
Figure 4.103b

CY1840



Figure 4.104a

SHOCK SPECTRUM



START=69146.5000SEC.

STOP=69150.0000SEC.

0=10.

VIKING B

ME CD 2(BUR)

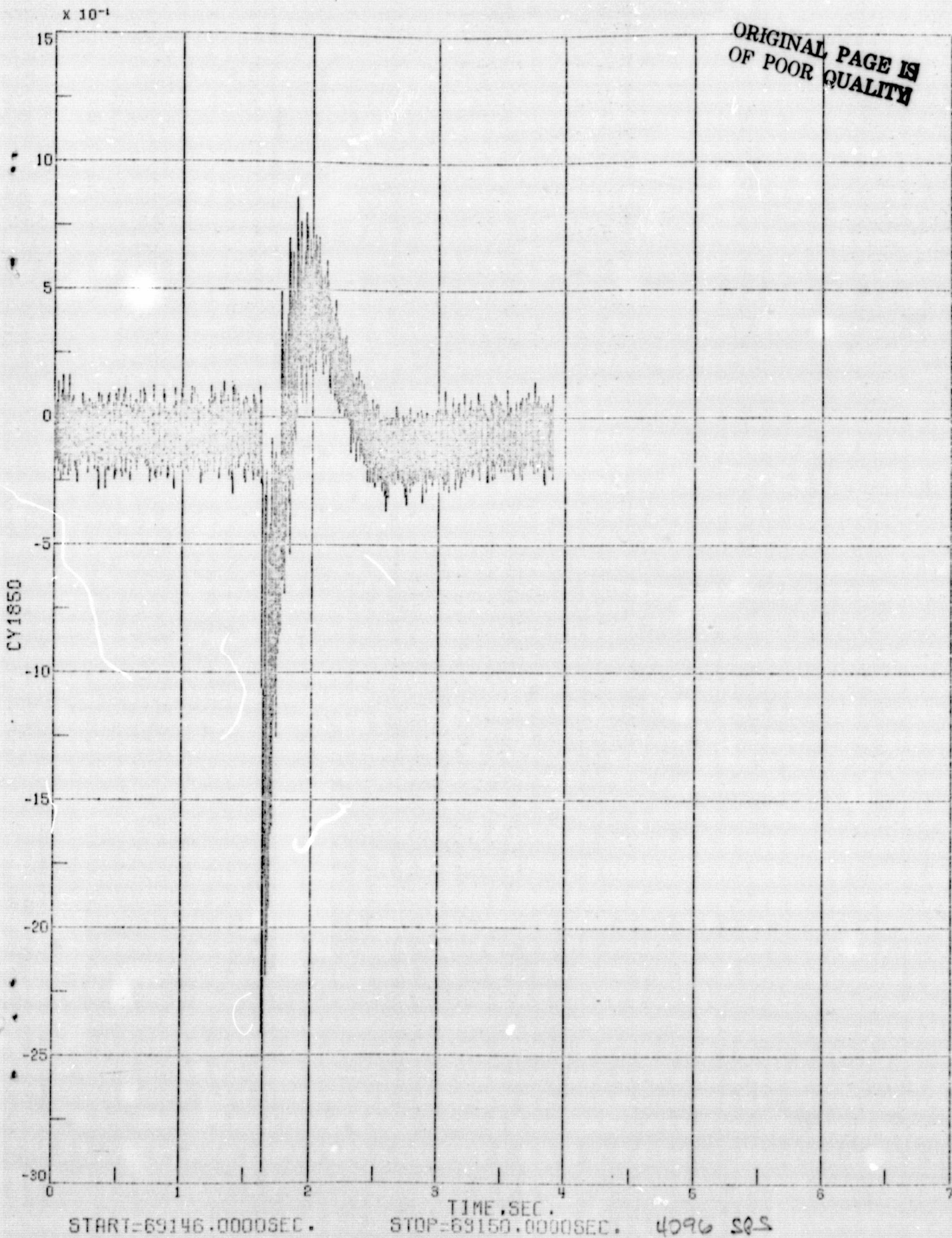
4096 S2S

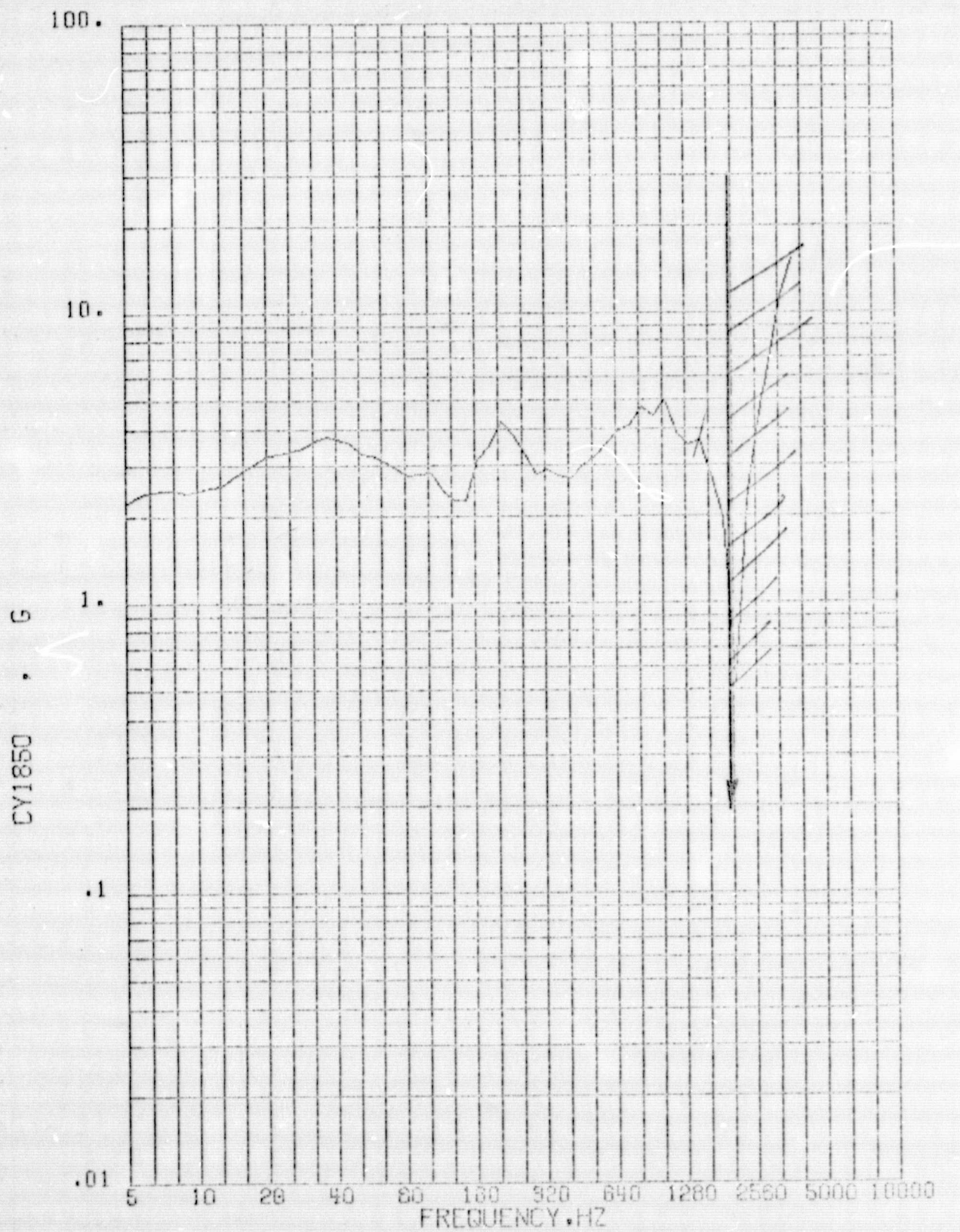
9/ CY1840

4.211

Figure 4. 104b

ORIGINAL PAGE IS
OF POOR QUALITY





START=63146.5000SEC.

STOP=63150.0000SEC.

B=10.

VIKING B

ME CD 2(BUR)

4096 SPS

9/ CY1850

4.213

Figure 4.105b